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ABSTRACT

This manual presents principles and methods of assistive technology in the context of rehabilitation of persons with disabilities. The manual contains eight chapters. The introductory chapter identifies assistive technology values and principles. The second chapter focuses on assistive technology as a problem solving process with various levels of service at specific stages in the rehabilitation process. The third chapter describes a comprehensive model of service delivery which stresses integration into the entire rehabilitation process and involvement of various agencies. Brief summaries of eight programs are included, as is a chart listing factors to consider in providing assistive technology services. The fourth chapter offers suggestions on methods of training staff, stressing a multidisciplinary team approach with strong consumer involvement. Chapter 5 provides guidance for financing assistive technology including charts comparing funding sources. The sixth chapter identifies national sources of information on technology related products and services as well as ideas for finding and using locally available resources. The seventh chapter focuses on long-term or strategic planning for assistive technology. The final chapter identifies social and legislative trends that will impact future services in this area. Eight appendices list study group members, summarize case studies, and present various assessment instruments. (27 references) (DB)

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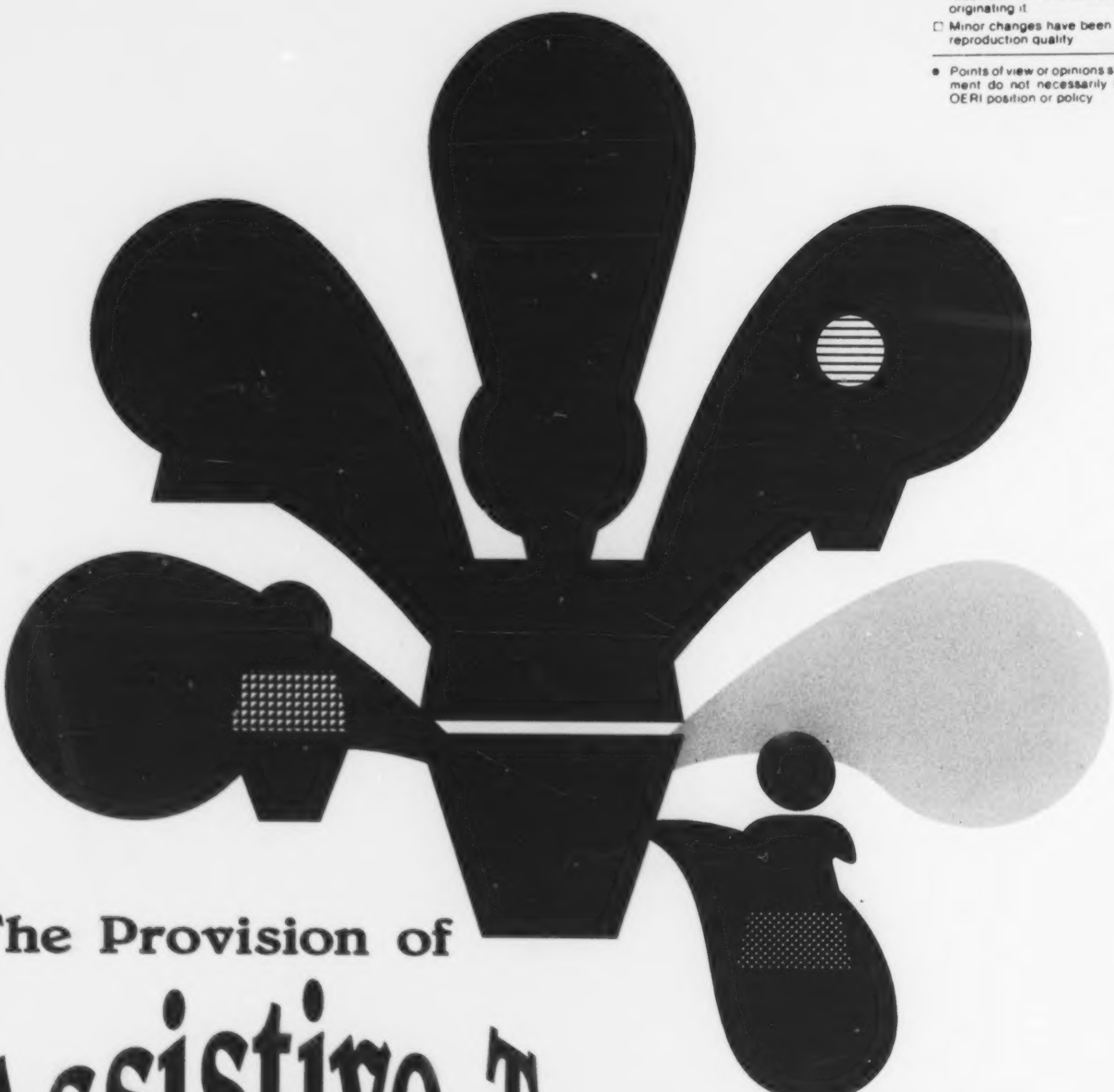

The Provision of
Assistive Technology Services
in Rehabilitation

Seventeenth Institute on Rehabilitation Issues

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Arkansas Research & Training Center in Vocational Rehabilitation University of Arkansas at Fayetteville Arkansas Rehabilitation Services

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Report from the Study Group on

The Provision of Assistive Technology Services In Rehabilitation

Seventeenth Institute on Rehabilitation Issues
Las Vegas, Nevada
October, 1990

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CHAIRPERSON'S COMMENTS

Assistive technology services have been used throughout history by people with disabilities to make their everyday lives a little easier. This is also true for rehabilitation services. Since its beginning in 1920 it has provided assistive technology to its clientele to help improve function by the use of devices. Interestingly, the advances in the field of technology have accelerated at a tremendous pace, making it difficult for the rehabilitation practitioner to stay abreast of all the developments. These technological advances have made it possible for an increasing number of persons with severe disabilities to either enter, or reenter the work force. For this reason, it is essential that practitioners have information on technology which could make it possible for recipients of these services to engage in competitive employment or live more productive lives.

This Institute on Rehabilitation Issues (IRI) Study Group was charged with the task of producing a resource document for administrators/managers and staff development specialists/trainers. The members of this group spent many hours searching for materials, sorting out relevant information, and writing up their assignments. It was indeed a hard-working group which is evident in the final edition of this document.

It was my pleasure to serve as Chairperson of this fine group of experts in the field of assistive technology. The Prime Study Group consisted of Dr. Douglas Rice of the University of Arkansas Research and Training Center in Vocational Rehabilitation (University Sponsor), Patricia Beattie of RESNA-Technical Assistance Project of Washington, D.C., Robert Hope of the Arkansas Division of Rehabilitation Services, Bill Johnson of The University of Wisconsin-Stout Research and Training Center, Joy Kniskern of the Georgia Division of Vocational Rehabilitation, Greg McGrew of the South Carolina Vocational Rehabilitation Services, and Carol Sheppard of the Michigan Department of Vocational Rehabilitation. The materials that follow represent an intensive effort by this group to meet the charges and the expectations of all rehabilitation agencies and organizations. Hopefully, our efforts have resulted in a document that deserves significant attention from all who assist persons with disabilities achieve greater independence through the use of assistive technology.

Barry Brandt
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FOREWORD

The Institute on Rehabilitation Issues (IRI) Prime Study Group attempted to write this publication in response to the needs of agency practitioners and collaborative consumer organizations. Further, the completion of this document has involved a number of rehabilitation professionals from various disciplines who critiqued and contributed to the content. Many issues were discussed in depth before the Study Group developed the following user-friendly chapters:

I. Introduction to the Study

II. The Assistive Technology Process

III. Components of Models for Delivering Assistive Technology Services

IV. Staff Development and Training in Assistive Technology

V. Financing Assistive Technology

VI. Resources for Assistive Technology

VII. Strategic Planning for Assistive Technology

VIII. Shaping the Future

The document provides definitions of common terms in the area of assistive technology and information on research and models. The Prime Study Group sought to describe available options to practitioners, and in the final chapter on Planning draws together issues, resources and models described in earlier chapters of the publication.

This document emphasizes consumer involvement and interagency collaboration. Practitioners are encouraged to tailor resources and models to meet their specific needs. In addition, they are encouraged to review the information at the end of each chapter and in Appendices A through H.

CHAPTER ONE

Introduction to the Study

This chapter introduces the IRI Study and provides a basis for what the Prime Study Group attempted to accomplish. Primarily, efforts were made to define assistive technology, to identify the values of the process, to describe key principles in the delivery of assistive technology services, to identify possible funding sources, and to stress the importance of training.

Definitions

The term "assistive technology" is used in this document to describe a process that makes use of devices and techniques to remove or reduce barriers or obstacles to physical, behavioral or cognitive performance. The application of assistive technology is not unfamiliar to rehabilitation practitioners -- the most significant new development in this area is the growing appreciation of the role played by the consumer in:

identifying barriers to functions,
recommending solutions based on experience,
selecting devices or techniques to enhance functioning, and
evaluating the effectiveness of assistive technology devices.

Examples of Assistive Technology

Assistive technology ranges from simple devices (e.g., a button hook) to complex computerized system (e.g., computer assisted speech output that interfaces with word processing and data management software). Assistive technology may be purchased as is, purchased and customized, custom designed or fabricated. It should be noted that, when devices are customized, designed, or fabricated, rehabilitation engineers or technicians are involved throughout the process.

The successful use of assistive technology to remove barriers to physical performance on the job and in activities of daily living is well established. The development of supported employment programs for people with developmental disabilities, mental illness, severe physical disability and traumatic brain injury has highlighted the potential for application of assistive technology for those with cognitive or affective disabilities.

Two areas of assistive technology, i.e., orthotics and prosthetics, and vehicle modification, are beyond the scope of this publication. Although these areas are well documented, the following resources are presented for those professionals desiring additional information.

Department of Prosthetics/Orthotics – Driving and Vehicle Modification
  Louisiana Tech University
  P.O. Box 10426
  Ruston, LA 71275
Prosthetics and Orthotics
  Resource Unit on Information and Education
  Northwestern University Rehabilitation Engineering Program
  345 East Superior Street, Room 1441
  Chicago, IL 60611

The selection of appropriate assistive technology could involve professionals such as counselors, employers, teachers, vocational evaluators, rehabilitation engineers, orthotists, prosthetists, occupational therapists physicians, or physical therapists, in addition to consumers.

Assistive Technology Values

The delivery of assistive technology must be based on a principle that includes need and use. The following factions should be considered in providing assistive technology services:

Access: Most participants in the rehabilitation process: consumers, families, rehabilitation practitioners, and other professionals involved with the consumer need more information about assistive technology. Information is needed about available techniques and devices that are user friendly to individuals with sensory and other disabilities. There is also a need for information regarding vendors, product evaluations and funding.

Consumers must have access to information about assistive technology in order to play an effective role in decision making. Consumer involvement builds ownership of decisions and assures input from the perspective of the user. Other participants in the rehabilitation process cannot consider or recommend solutions they do not know exist.

Agencies must train their staff to evaluate feasibility in a context that includes consideration of assistive technology. To assure quality of life and effective vocational functioning, assistive technology should be considered and used at the earliest appropriate age. Public policy for services to infants and children should incorporate individual evaluation and application of assistive technology for children who have disabilities.

Counselors must be sensitive to cultural differences in the perception of assistive technology and be able to discuss assistive technology in terms that are culturally appropriate. For example, in many Native American groups, a high value is placed on controlling the environment through traditional practices. Discussions with tribal elders and family, along with an opportunity for all these parties to try out equipment, may be necessary (Chadsey-Rusch, 1986).

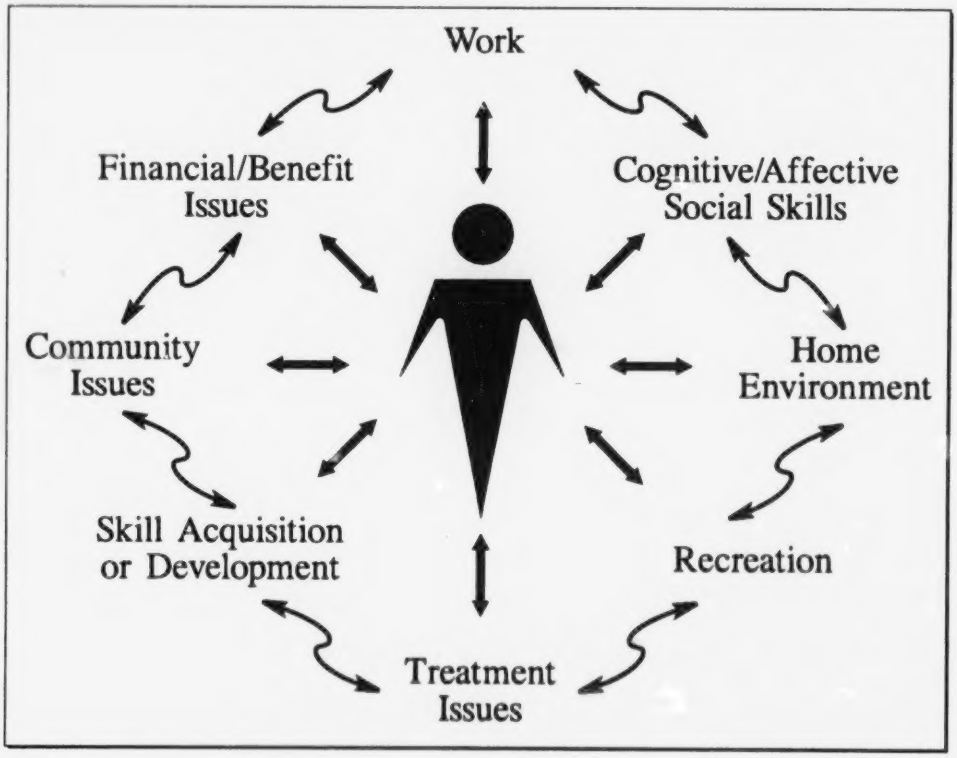
Application: Assistive technology may be applicable to all disability groups in all phases of the rehabilitation process, not just to people with severe physical disabilities in work settings. While there has been considerable media emphasis on the use of computer assisted activities in work settings for individuals who have physical disabilities, the assistive technology process is applicable to individuals with cognitive and affective disabilities as well. In addition, the effectiveness of activities such as work evaluation and vocational training can be enhanced by providing appropriate assistive technology.

Analysis: Analysis is a key skill in the delivery of assistive technology services. The analysis process should begin with a thorough assessment of consumer skills, capacities, and interests. An analysis of the functional demands of the task or setting must be made before adaptive devices or services can be selected and used (see Figure 1.1).

The analysis must consider the constellation of activities in the individual's life. This approach can ensure integration of "solutions" in one area (e.g., school) with those in other areas (e.g., work). Finally, the analysis process must consider the individual's short and long-term goals.

Figure 1.1

Integration Model — Life Activities



The analysis process is a team activity in which the consumer must be a full and equal member. Consumer participation can ensure agreement and understanding by the consumer; it also ensures that the individual who has the most first-hand information about problems, barriers, and goals, is a team member.

Appropriateness: When evaluating the appropriateness of an assistive technology application questions such as the following should be considered:

Has the consumer been involved as a decision maker?
Does the technology address the identified barriers to performance? Does it create new problems?
Is it cost-effective from the consumer's perspective (maintenance, replacement and upgrading)?
Is it aesthetically satisfactory?
Can it be integrated with other devices or techniques used by the consumer?

Assistive Technology Principles

The providers of rehabilitation services including assistive technology should operate from a well-defined set of principles. The following principles used in this publication merit consideration as guidelines for practitioners in the area of assistive technology.

Enhancement: *The primary goals of assistive technology are enhancement of capacities and removal of barriers to performance.*

Decision-Making: *The consumer is the key decision maker in the assistive technology process and must play a role in identifying functional limitations.* The consumer must be able to consider options, acceptable from his/her perspective, from which solutions for functional limitations be selected.

Analysis: *Systematic problem analysis and problem solving are essential skills when providing assistive technology.*

Function: *Function, and not disability, should be a primary consideration when providing assistive technology.* This approach permits the practitioner to focus on the individual's capacities.

Applicability: *Assistive technology is applicable to all disability groups and in all phases of the rehabilitation process.* For example, an audio cassette player with sequential directions could be an aid to short-term memory of an individual in an on-the-job training program; a daily calendar might compensate for poor organizational skills in training or at work.

No Technology: *The best technology may be no technology.* For example, problem analysis may reveal that rearranging the sequence of tasks may eliminate the need for an assistive device.

Least Complex: *The least complex intervention needed to remove barriers to performance should be a first consideration.* This approach can enhance independence through reduced reliance on equipment, cost and maintenance.

Social Skills: *Providing assistive technology does not eliminate the need for social skills. At home, at school, and at work, the largest part of the "job" is social interaction.*

Techniques: *Other techniques in addition to devices should be considered.* For example, job coaching, time management, behavior management, and design changes can reduce or remove functional barriers.

Attitudes: *Practitioner attitudes toward technology should be assessed.* Passion about, or discomfort with technology should not determine consumer outcomes. Additional training in one's assistive devices and techniques may be necessary to adequately prepare practitioners to be helpful in the assistive technology process.

Barriers: *It should be recognized that technology can create barriers as well as solutions.* Devices and techniques may isolate the individual or reduce his/her independence.

Lone Ranger Rehabilitation: *Lone ranger rehabilitation should be avoided.* The assistive technology process requires team work, and the team includes the consumer, counselor, and other parties such as employers, teachers, work evaluators, occupational therapists, physical therapists, and rehabilitation engineers.

Cultural Views: *The practitioner must understand the consumer's cultural perspective of work, independence and technology. Decision making is approached differently across cultures.* Independent decisions may not be appropriate in the consumer's culture. It is important to assess who else should be involved in decision making; it may be grandparents, the extended family, or tribal elders.

Follow-Up: *Follow-up and post-acquisition adjustments are essential activities in the provision of assistive technology.* Even well-conceived plans need adjustments in the real world.

Preparation: While consumers need access to information to be informed decision makers, *rehabilitation practitioners also need information and a voice in planning for the changes in roles and service delivery that will occur with the increased use of assistive technology.*

Familiar Techniques: Although assistive technology equips rehabilitation practitioners with new tools, *the process builds on the familiar techniques of evaluation ANALYSIS, planning, and service delivery.*

Target Audience and Terminology

When the Prime Study Group began work on this publication, the focus was on provision of assistive technology in state rehabilitation agencies. As the work progressed, it was realized that the chapters applied to activities funded under The Technology-Related Assistance for Individuals with Disabilities Act of 1988, P.L. 100-407 Act (Tech Act) where assistive technology is provided to a broader audience and in a wider range of settings in Tech Act programs.

As states have gained experience with the delivery of assistive technology through the Tech Act, those experiences have shaped how assistive technology services are delivered in public rehabilitation agencies. Examples of influence include greater emphasis on the role of the consumer, the importance of team collaboration, and the need to explore alternative avenues of funding. *Therefore, this document is directed toward the larger audience of individuals and groups involved in assistive technology.*

In developing this publication the Prime Study Group faced word choices and their underlying values. For example, the term *consumer* was used rather than the traditional rehabilitation term *client*. The word consumer carries with it connotations of choice and independence.

For clarity, an attempt was made to maintain the distinction between *limitations* (activities an individual cannot perform or performs at a reduced level) and *disability* (a medical condition that results in one or more limitations).

Practitioner is used to describe the full range of professionals who practice in the field of rehabilitation.

Barrier is used to encompass attitudinal, social, physical, sensory, and perceptual obstacles to performance.

Conclusions

Although the concept and use of assistive technology are not new to the field of rehabilitation, the growth and development of new and innovative devices and techniques demand that practitioners have as much information and knowledge as possible about this service area. Unquestionably, the future will see the development of even more devices and techniques to expand the horizons of people with disabilities in independent living and the world of work. Many implications for the practitioner include better use of the rehabilitation team, including the consumer and family. Further, evaluations must include the assessment of the appropriateness of the device or technique for the person as well as acceptance of use in the individual's culture.

For additional information on evaluation and assistive technology, see the Amendments to the Rehabilitation Act, L. 99-506, Title I, Section 103.

CHAPTER TWO

The Assistive Technology Process

I. Objectives:

1. to identify the application of assistive technology as a systematic problem solving process containing key steps which must be followed to ensure the long term success of the solution
2. to show how the assistive technology process can be integrated into the more comprehensive process of rehabilitation or independent living
3. to outline and describe different levels of service provision and the type of resources necessary to provide services at each level
4. to establish the importance of the team approach to assistive technology problem solving and the inclusion of all who may have a stake in the final solution

II. Summary

Assistive technology is a problem-solving process which involves the application of technology and engineering principles to barriers faced by those with disabilities. It is a process which should be integrated into the fabric of the goal attainment process of vocational rehabilitation or independent living to enhance the vocational potential of consumers. Areas where assistive technology can be applied include vocational evaluation, work adjustment, education and training, home independence, transportation, job accommodation, recreation and leisure.

There are different levels of assistive technology services. Each level demands different skills, training, and resources of the service provider. A means to problem resolution may be obtained at any one, or a combination of, levels for any particular barrier the consumer faces. The most appropriate type of intervention is often determined by the complexity and/or uniqueness of the problem.

The assistive technology process should involve a team of individuals who have expertise relating to the problem and its potential solutions. The pivotal member of this team is the consumer, who will play the key role in determining the eventual success or failure of the team's attempt at problem resolution. As such, the consumer must be an active participant in the assistive technology process from beginning to end. Also, input should be sought from all who have a stake in the outcome of the problem resolution, i.e., family members, care-givers or co-workers.

All steps in the problem-solving process should be implemented when applying assistive technology. Of particular importance in the assistive technology process is the follow-up phase. Often omitted in problem-solving, it is essential for the success of the process.

Consumers and service providers should be wary of becoming too dependent on the technical solution. It would not be prudent to impose dependence on a device if the problem can be more effectively addressed in other ways. While assistive technology can be a powerful tool for rehabilitation professionals, experience in using it is the key to applying it effectively.

III. Discussion

Most definitions of assistive technology (and there are many) focus on the development and use of devices. The federal government, through the Technology Related Assistance for Individuals with Disabilities Act of 1988, defines technology service as:

> *"any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device."*

This definition encompasses much of what assistive technology is all about. However, if assistive technology is to be understood as an effective tool for rehabilitation professionals use with consumers, the definition must be broadened to include not just the hardware, but also the process of assistive technology application and implementation. As defined in Chapter 1, assistive technology describes a process that uses devices and techniques to remove or circumvent barriers to physical, behavioral, or cognitive performance.

The Assistive Technology Process

The assistive technology process typically involves augmenting, altering, or supplementing the performance of an individual with a disability to permit that individual to meet or exceed a specified criteria of performance which the consumer may not otherwise meet due to the particular disability. This process is one of problem solving--some might say "technical" problem solving. It consists of the following steps common to most types of problem solving:

1. problem identification,
2. development of alternative solution,
3. choosing an alternative,
4. solution trial,
5. re-evaluation (if needed) and
6. follow-up.

Of course, each of these steps can be broken down into finer actions with each action's complexity varying with the problem being considered. While each step is critical to the success of the process, the importance of some steps is often overlooked. Problem identification is in some ways the most critical because it sets the course the problem solving team will travel en route to the final solution. When that course is established, team efforts may be difficult and costly to redirect, if redirection is necessary. It is, therefore, important that the team undertake this step in a thoughtful manner, being careful to eliminate extraneous issues which may distract the team or disguise the core problem.

Not only must problem identification be accurate, but that which is identified as the problem by the problem solving team must be recognized as such by the problem-generator, i.e., the consumer. The consumer will be much less likely to contribute to the problem solving process if he/she is not convinced that team efforts are directed towards the problem he/she presents.

Problem solving endeavors maybe undermined when only one alternative is identified. While a particular course of action may seem to be the obvious solution, an attempt should be made to develop other possible ways of solving the problem. Developing alternatives helps foster team creativity by forcing team members to examine the problem from different perspectives, and will give them the means to better evaluate solutions through comparison among the alternatives.

After multiple alternatives are identified, one must be chosen for implementation. This choice will be based on the synthesis of information collected on the nature of the problem, and how it might best be addressed. The difficulty of the selection will depend on the number of viable alternatives developed, the complexity of the problem identified, and the importance of factors such as cost and time constraints. In situations where selection is difficult, it may be appropriate to chose one to be tried, and depend on the trial itself to yield more information from which to determine the most appropriate solution.

While it may not always be practical for the rehabilitation practitioner to establish a formal solution trial period with the consumer, the consumer, in fact, conducts a trial while using the new device or technique. If the adaptation is found to be unsatisfactory, another alternative will likely be chosen, whether one is supplied or not. This choice is likely to be simply to not use the device, and return to status quo. The importance of this trial step, in addition to ferreting out unidentified problems, is that it establishes that, other possible solutions exist and can be tried (assuming the chosen solution does not work).

Follow-up is the step that is often omitted from the assistive technology process, but if conducted with proper diligence, yields the most to ensure long term success of a solution. Follow-up encompasses those re-assessment activities which a) are undertaken after the solution has been implemented; b) determine whether the applied solution has satisfactorily addressed the problem identified; and c) corrective action to the solution if appropriate. Proper follow-up is not just calling the consumer to check on general satisfaction with a solution. At a minimum, it involves discussion with the consumer and other affected parties (e.g., family members, employer) regarding the solution effectiveness, useability, and wear, and documentation of the same. Often follow-up includes readjustment of the adaptive solution, and may involve rejecting the solution, and starting the problem solving process over.

The time between solution implementation and follow-up should vary with the type of problem being addressed. Enough time should be allotted to make the adaptation's use routine--a good rule of thumb is to allow the consumer at least three times as long as the trial period set up a few steps earlier.

That which identifies the problem solving endeavor as assistive technology is the type of problem or barrier being addressed, and the type of problem solving tools to be applied. The problem is the inability of a disabled individual to perform an activity or activities at a specified level of competence due to the disability. The tools applied in addressing this problem are electrical and mechanical devices, biotechnology principles, and training in the use of the device or technique developed in the process.

This chapter will explain how this assistive technology process can mesh effectively with rehabilitation, in itself a complex problem solving process in which assistive technology can play a part.

Assistive Technology Applications During Rehabilitation

Application of assistive technology during vocational rehabilitation often occurs toward the end of the rehabilitation process when the counselor and consumer are working with an employer toward job placement. Worksite adaptation, or more generally, job accommodation may be required to provide the consumer the means to competitively perform the job tasks. This type of assistive technology intervention is that which is thought of most often in a vocational rehabilitation setting. If, however, a vocational rehabilitation program limits the use of assistive technology to job accommodation alone, a broad variety of opportunities to further consumer progress toward vocational objectives may be missed. Such opportunities present themselves throughout the rehabilitation process, from the preliminary diagnostic study to closure. Individual phases of the rehabilitation process with consideration for assistive technology are reviewed in the following pages. Table 2.1 presents a summary of this information.

Rehabilitation programs should consider assistive technology when developing policies. A list of policy development questions are included in Appendix F.

Diagnostic Study - Determining Eligibility

Consumers applying for services through rehabilitation agencies undergo a diagnostic study to establish their eligibility for agency services. One criteria for eligibility is that the consumer have vocational potential. *It is critical that the context in which the diagnostic study is done includes consideration of assistive technology and how it may enhance the consumer's potential for employment.* If assistive technology is not considered, there is a risk of eliminating those who could otherwise benefit vocationally from agency services. Practitioners and referral agencies may need assistive technology awareness training if they have not been exposed to the technology area. Such training is discussed in Chapter 4 of this publication.

Vocational Evaluation

Vocational evaluation is an area where consumers can frequently benefit from assistive technology interventions. Intervention may be a modification of a work area to provide an ergonomically designed environment in which to test. A consumer with low back pain due to injury may need such an accommodation in order to sit for written exams or to perform work tasks. An individual with cognitive impairments may need to be isolated during evaluation to eliminate distraction, and given visual instructions and cues to guide him/her through a sequence of testing tasks. Testing and evaluation may also need to be facilitated through the application of adaptive writing aids, computers, and typewriter adaptations for consumers whose disabling conditions limit their ability to take "pencil and paper" tests.

Table 2.1

Technology Applications by Problems and Stages of the Rehabilitation Process

Stage in Rehab Process	*Types of Problems*	*Examples of Applications*
Diagnostic Study	Counselor and/or consumer is unable to visualize how consumer will be able to perform work.	Evaluation of potential of devices and techniques to increase function, e.g., can individual efficiently access computerized speech device.
Work Evaluation	Consumer unable to complete work samples due to problems with organization, coordination, retention.	Modeling to aid in organizational skills, jigs and fixtures to aid with coordination, community based evaluation to help with retention, also taped instructions.
Work Adjustment	Work adjustment facility has no work which can be performed by individuals with severe disabilities.	Operation for stuffing envelopes is adaptive with holding fixtures for envelopes to permit one-handed individual to perform task.
Academic Training	Consumer has reading, writing, memory or organizational deficits.	Voice output in lieu of reading, spell checkers and macros to aid in writing; calendars, behavior management techniques to aid organizational skills.
Skill Training	Consumer with severe disability is unable to pursue vocational training due to inaccessibility of training facilities and equipment.	Work table is lowered and cut out to permit individual in wheelchair to access tools, have usable work surface.
Job Placement	Consumer has function in only one arm and cannot perform work tasks of job he is otherwise qualified for.	Work station is adapted with holding fixtures and devices which permit consumer to perform tasks required.

Assistive technology consultation during this phase of the vocational rehabilitation process can help to ensure that vocational objectives which may require job accommodation will be considered, in addition to those which may be performed, given existing functional capacities. The potential impact of job accommodation on a consumer's vocational potential suggests that evaluators should be trained in assistive technology. A broad understanding of assistive technology resources and the capacities of those resources for job accommodations will assist the vocational evaluator in identifying the broadest possible range of placement alternatives.

It is at the completion of this phase that the practitioner documents goals, objectives, and activities planned to achieve the goals. For vocational rehabilitation agencies, this occurs in the Individualized Written Rehabilitation Program (IWRP). Two types of assistive technology documentation should be included in the IWRP. They are a) recommendations/plans regarding specific assistive technology interventions that can be identified up to this point, such as a power wheelchair, or home health adaptive device; and b) general plans for assistive technology interventions which may be identified in the future, such as job accommodations or devices needed for completion of training/educational goals. Inclusion of assistive technology in the IWRP will help insure the integration of technology into the consumer's rehabilitation process.

Work Adjustment

Like other VR consumers, those with severe disabilities may need a period of work adjustment. They are, however, often excluded from doing so because they are judged to be too severely disabled to competently perform on rehabilitation facilities' contracts (or in competitive work environments). Whether it is handled by shop supervisors or outside assistive technology consultants, worksite adaptation is often the key to work adjustment for consumers. The goal of job accommodation in such a setting is not to adapt a work station for the consumer's eventual occupation, but rather to afford them access to the benefits of work adjustment.

Education

For consumers whose vocational objectives require that they receive further education (e.g., GED, technical schooling, college), completion of that education becomes an initial objective on the way to placement. Consumers with physical impairments may need assistive technology to achieve this objective. In this case, technology assistance may take many forms, such as an augmentative communication device to permit the consumer to interact with instructors and other students; an adaptive input device for a computer, for someone who cannot use a standard keyboard; an auditory or visual cuing system for cognitively impaired persons which guides them through a learning routine and keeps them on task; or on a larger scale, a complete work station for someone with quadriplegia, adapted to permit indepth manipulation of a computer or typewriter, papers, and books.

Vocational education involving skills and technique training may require more involved and elaborate assistive technology intervention, such as modification of mechanical tools and electrical fixtures and instrumentation. Unlike adaptations for work adjustment facilitation, these modifications should have direct application for the consumer's employment objective.

As in other areas, the counselor and consumer may be presented with disability- related barriers to achieving the consumer's educational objectives. The problem solving process of assistive technology can be applied to eliminate or circumvent those barriers.

Transportation

The lack of dependable transportation can often be the major, and perhaps only, stumbling block to a consumer's successful job placement. Assistive technology in the form of hand controls for a car or a van (with varying degrees of sophistication depending on the consumer's level of function) and/or a van lift may be needed to overcome this barrier. When dealing with independent transportation, the counselor and consumer must consider not only how to transport the consumer, but also his/her wheelchair. There are a variety of commercially available devices and adaptations to address these transportation needs. Chapter Five refers to some excellent resources and provides specific information on this topic.

Job Accommodation

As mentioned previously, job accommodation is the type of assistive technology process most associated with vocational rehabilitation and it typically occurs toward the end of the consumer's rehabilitation when functional capabilities are fairly well known, and a specific job has been identified as the employment target.

A key member of the assistive technology team in job accommodation is, of course, the employer. This team member may, in fact, be a collection of individuals including the consumer's immediate supervisor, higher level managers, human resources personnel, and co-workers. As with the consumer, the employer *must "buy into" the job accommodation* if it is to be successful in the long term.

The rehabilitation practitioner should be aware that "buying in" may mean different things to each member of the employer group. The supervisor and manager must be convinced of the potential for the consumer to be competitively productive with the accommodation, and that as such, employer's investment in the accommodation has been worthwhile.

The consumer's co-workers, on the other hand, may be more concerned with how an accommodation will affect them personally. They may be concerned about questions such as: Will it increase the amount of work they have to do? Will it change their task routine? Is the accommodation for the worker with functional limitations something that might make the job easier? This diversity of concerns makes it prudent to solicit as much input as practical and from each member of the employer group possible accommodation alternatives.

As outlined previously, job accommodation involves the classic problem solving progression: identify the problem, develop multiple alternatives, choose the best solutions, try the solution and conduct follow-up. These phases are outlines in a more detailed form in a 1986 publication by RESNA, **Designing jobs for handicapped workers** (reproduced by permission). In this booklet, the authors chart the process of job accommodation through these stages and describe each stage in detail (see Table 2.2).

Independence at Home

The more independent the consumer is in personal care, the more dependable that consumer is likely to be in preparing for work on a daily basis. If one assumes that greater independence and self reliance are positive worker traits and, in fact, should be fostered, then the consumer's home is probably the most appropriate place to start developing these traits. Applications of assistive technology in the home can often provide the consumer who is severely disabled with the means to be more independent in hygiene and controlling the environment (lights, television, other appliances), in feeding and meal preparation, and in general, access to all areas of the home.

Recreation

The physical, psychological and emotional benefits of participation in a regular program of recreational activities are well documented. Facilitation of such activities for individuals who are disabled must often be accomplished through the creative application of assistive technology. A growing number of adaptations and devices are being developed for this purpose. Resources for information on these devices include the Fred Sammons Catalog (800-323-5547), a resource guide put together each quarter by Sam Maddox (800-338-5412), and a new catalog of products developed by Access to Recreation, Inc. (800-634-4351).

Levels of Service

In any particular area of assistive technology service delivery, whether it be in mobility or sensory aids, augmentative communication, adaptive driving, or one of several other categories, problems may be solved from any one of seven levels of what constitutes a hierarchy of services (see Table 2.3).

This hierarchy is based on the level of complexity of the services required to solve the problem, and the type of resources and/or skills necessary to solve the problem at that level. What level of assistive technology service may be required in solving a problem for a consumer will depend on the rehabilitation practitioner's own knowledge of pertinent assistive technologies - whether an altered technique or rearrangement might overcome the barrier (level 3), whether there is a commercially available device which will address the problem (level 4), or whether some customized device might be the only solution (level 6). In any event, the solution developed will be rendered at one or more of the levels in this hierarchy.

Some assistive technology resources provide information only. These resources would fall into Levels 1 or 2 (see Chapter 5 for resource information). One example of such a resource would be ABLEDATA, the computer database which lists a broad variety of commercially available adaptive aids, including descriptions, and manufacturer information. Another example could be a local chapter of Easter Seals, or other private organization which serves individuals who are disabled. In many cases such resources and the information they provide may be all that is needed to help consumers overcome the barriers they face. At other times, the practitioner may need to reach higher up the services scale to find the help needed by the consumer. An example of this would be a consumer with mobility problems who needs some means of bathing independently. The individual may have arthritis and cannot get down into the tub, and cannot take a shower without fear of falling. The solution for this person might be a tub bench and hand held shower wand. Such devices are commercially available and can typically be found at a local durable medical equipment (DME) dealer. (Look under "wheelchairs" in the yellow pages.) Such retailers are very valuable resources for the rehabilitation practitioner working with severely disabled consumers. While most would fall into Level 4 in Table 2.3, larger operations may have fabrication capabilities and fit into Level 5, or even 6.

These higher complexity levels, however, are typically occupied by service providers who are solely dedicated to one or more categories (see Appendix C) of assistive technology. The need for such services occurs when, in the assistive technology process, the solution deemed most appropriate is one requiring a customized device or devices. Such is the case with some types of job accommodations. For example, desk fixtures and materials, such as typewriters, notebooks, and reading materials may all need to be repositioned with respect to an office worker with back pain. In the process of assistive technology problem solving, it may be found that the most appropriate means of orienting certain items is through custom built shelving, stands, and other fixtures. This is not to suggest that there aren't commercially available alternatives, but that in the process of problem solving (weighing options), customized hardware was found to be the best solution overall. This, in turn, suggests that the service hierarchy does not imply that one level necessarily provides a better or more expensive solution than another, but only that the knowledge/skill base required by those providing these services differs.

The development of the hardware mentioned above will require the coordination of those with an understanding of specific consumer needs with those who can produce the hardware. These parties may be the same individual or organization, but more often will be separate entities which comprise part of a team of problem solvers brought together to develop solutions.

Table 2.2

PROBLEM SOLVING **THE PROCESS FOR JOB ACCOMMODATION**

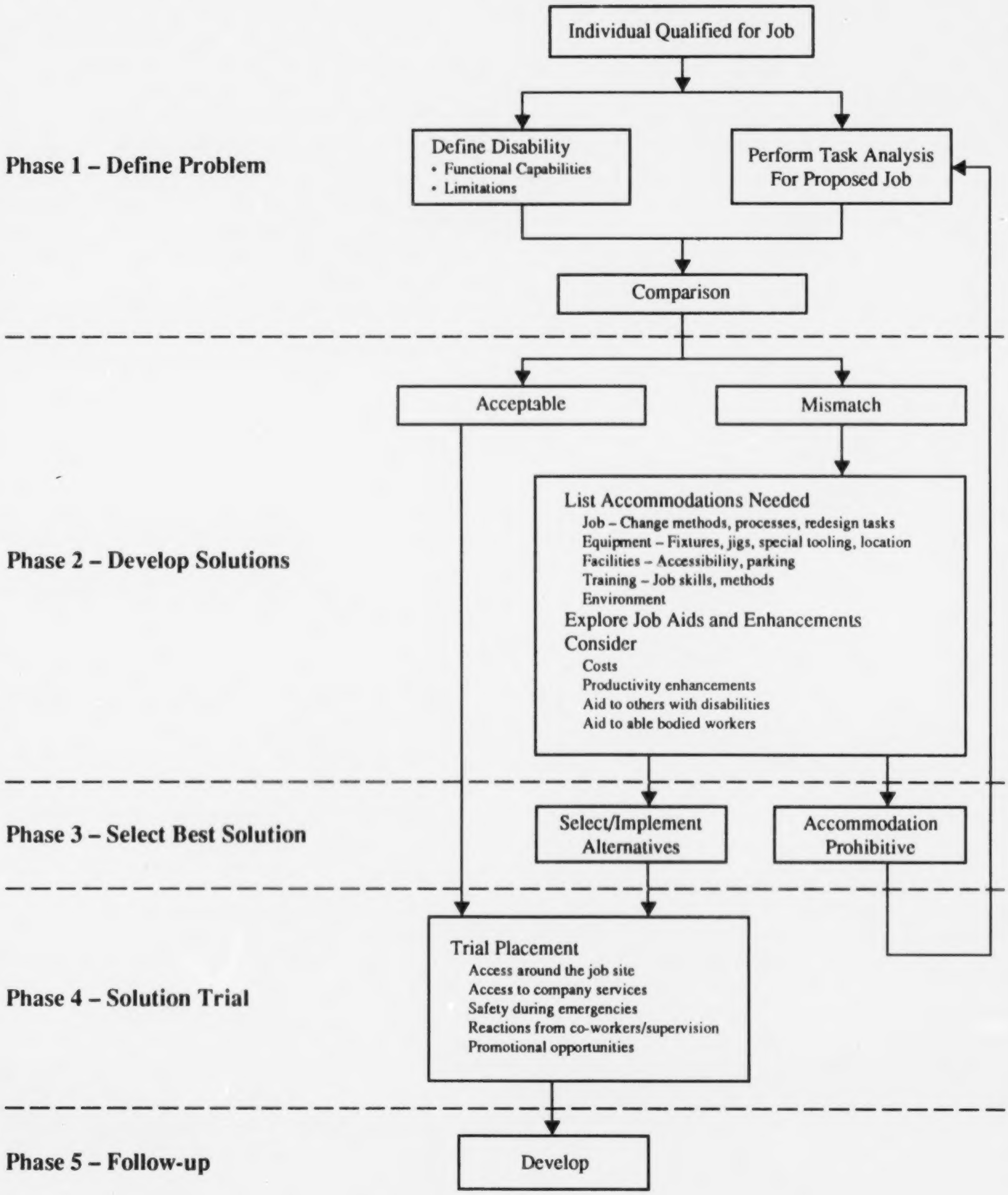

Individual Qualified for Job
Phase 1 – Define Problem
Define Disability
• Functional Capabilities
• Limitations
Perform Task Analysis For Proposed Job
Comparison
Acceptable
Mismatch
Phase 2 – Develop Solutions
List Accommodations Needed
Job – Change methods, processes, redesign tasks
Equipment – Fixtures, jigs, special tooling, location
Facilities – Accessibility, parking
Training – Job skills, methods
Environment
Explore Job Aids and Enhancements
Consider
Costs
Productivity enhancements
Aid to others with disabilities
Aid to able bodied workers
Phase 3 – Select Best Solution
Select/Implement Alternatives
Accommodation Prohibitive
Phase 4 – Solution Trial
Trial Placement
Access around the job site
Access to company services
Safety during emergencies
Reactions from co-workers/supervision
Promotional opportunities
Phase 5 – Follow-up
Develop

Table 2.3

Hierarchy of Assistive Technology Services

Complexity Levels of Services Provided	*Resources/Skills Required by Service Provider*
1. Information	Basic knowledge of resources, simple commercial devices and an updated collection of printed information (specifications, product catalogues, brochures, etc.)
2. Development/application of modified techniques	Training/knowledge base in disability, job tasks
3. Selection, modification, and application of commercially available devices	All of above, plus access to knowledge of commercially available adaptive devices
4. Selection, modification, and application of commercially available devices for customized problem solving	All of above, plus fabrication capability
5. Design and fabrication of customized devices to meet consumer needs	All of above, plus knowledge base in engineering/design
6. Combination of above	All of above

Team Concept

As with any problem solving endeavor, the process of developing creative solutions can be enhanced by gaining different perspectives on the problem. The assistive technologist should not work in isolation, but address each problem through a team approach. The structure of the "team" will vary with the nature and complexity of the problem to be addressed, but also with the level of skill and expertise offered by the service provider. The adaptation of someone's wheelchair to offer the consumer function-enhancing body support may require a team consisting of a physical therapist and/or occupational therapist, VR counselor, seating specialist or rehabilitation engineer with seating expertise, consumer family member(s), and, of course, the consumer. Development of an appropriate worksite adaptation for a consumer with a severe disability would necessitate the involvement of the employer, counselor, assistive technologist, consumer and possibly some mechanical or electrical fabricator. While it is recognized that the bringing together of teams of these types may not always be practical, efforts should be made toward receiving all input practical in dealing with the problem. Omission of input from parties which may have a stake in the solution often leads to faulty, unsatisfactory fixes, thus necessitating rework of the solution.

Having discussed the need for a team approach to assistive technology applications, it is recognized that many service delivery environments do not harbor all the types of team members listed above. Still, as much as possible, one needs to try to gain input from those with both knowledge and stake in the solution. In so doing, resources should be pulled from the service provider's immediate environment.

IV. Conclusions

Applying assistive technology to problems faced by the individual with disabilities is often a simple exercise in information gathering and referral. On occasion it is more complicated, and requires the intervention of practitioners trained in an area or areas of assistive technology. Input from all appropriate "team" members can help to insure that the technology and level of service chosen to address the problem will result in the best overall solution. Having said this, it must also be stated that assistive technology is often not as effective as it might otherwise be, particularly if the crucial, final step in problem solving is omitted from the process - follow-up. Too often the process is considered complete when the consumer achieves the desired goal and is apparently able to overcome the barrier to performance. The rehabilitation practitioner must assess what the long term implications of this adaptation are for the consumer. If it is a customized device, who will repair it and maintain it? Will it continue to meet the consumer's needs over time? Will the consumer actually use the device or modification when not scrutinized? Even with the finest of resources developing the most well thought out solution and applying that solution with care and thorough consumer training, these kinds of questions may only be answered over time. As such, time should be built into the process, which cannot be completed until follow-up is conducted. Such questions also highlight, once again, the critical nature of the consumer's active participation in the process. Follow-up discussions with the consumer on needed adaptations or adjustments to the solution are likely to produce more satisfactory results if the consumer feels some sense of ownership of the original solution and mutual trust with the rest of the team.

Care should also be taken in becoming too dependent on technical solutions to barriers encountered by consumers. The consumer may be better off not being dependent on a device to perform certain tasks, even if the device may speed or simplify the task. For example, a consumer with quadriplegia has trained himself to transfer from his bed to his wheelchair without a transfer board, and without injury. It may be faster for him to perform the transfer with a board, as well as less fatiguing. If, however, he were to start using the board on a regular basis, he may loose his ability to transfer otherwise. He has then become more dependent than independent and may find himself in situations where he cannot transfer because, for whatever reason, he has no board.

Like any tool, if assistive technology is to be used effectively, the user must learn how to handle it over time. Experience with the tool will teach the user in what situation it is best applied, and on what types of problems it is most effective. Experience will also give the user confidence in its applications to new problems, as well as an awareness of its limitations. Used wisely, it will provide its user with a powerful mechanism for eliminating barriers to user objectives.

CHAPTER THREE

Components of Models for Delivering Assistive Technology Services

I. Objectives:

1. to classify models of assistive technology service delivery
2. to identify the spectrum of assistive technology services used to plan comprehensive, consumer-responsive programs
3. to recommend a new paradigm for understanding technology service delivery in today's environment
4. to describe successful models for assistive technology service delivery

II. Summary

This chapter provides information about models for service delivery designed to challenge the reader to cultivate a broader view of assistive technology as a service, and integrated throughout the entire rehabilitation process and the consumer life span. The role of other agencies in the delivery of assistive technology services is also discussed in the chapter.

Several systems for classifying models of technology service delivery are reviewed to provide the reader with a conceptual framework. Today's environment requires the full spectrum of assistive technology services which are consumer-responsive, comprehensive, and coordinated.

A new paradigm (model or example) for service delivery builds the foundation for assistive technology services in today's rapidly changing environment (see Chapter 7, Planning). Summaries of a number of programs of assistive technology illustrate the variety, complexity and breadth of models that are available today.

III. Discussion

Recent literature and legislation (The Technology-Related Assistance for Individuals with Disabilities Act of 1988, P.L. 100-407) spotlight the spectrum of assistive technology services consumers need across all environments throughout a life span. Today, discussion focuses on needs for:

- a range of comprehensive technology-related services
- a system of service delivery which integrates technology services into existing programs and coordinates services between these programs
- a broader view of technology as a basic support service (Enders, 1989)

Assistive technology in today's environment and in technology is viewed by consumers and practitioners as an entitlement that is essential for full integration in the home, school, work and community. This perspective is creating tremendous pressure upon public rehabilitation agencies to find creative and effective ways of meeting consumer demands with fewer resources.

Assistive technology service is a process, not a one-time activity. Its provision requires comprehensive, carefully planned and coordinated services. A spectrum of services should be available throughout the rehabilitation process and documented in the Individualized Written Rehabilitation Program (IWRP). Morris (1990) suggested that every IWRP should ask the question, "Have the technology needs of this individual been addressed?" This question is not restricted to employment-related technology needs, but implies a broader definition of technology as a support service.

This broader view is intended in the Rehabilitation Amendments of 1986. Yet, in the Act, "rehabilitation engineering" is modified by the term, "as appropriate." While this qualifier may be expressively used to deny services, clearly the congressional intent was expansive. Since many practitioners are not familiar with new technologies, determining appropriateness may be unrealistic. (See Chapter 4: Training for Assistive Technology).

Some technologies (e.g., augmentative communication and robotics) are changing so rapidly that eligibility determination based upon "reasonable expectation for employment" is difficult. The impacts of new technologies in the work environment are not wholly known. For example, augmentative communication technologies open new employment possibilities in certain customer service operations. Yet, there are few examples available to rehabilitation practitioners.

New programs like supported employment are redefining "reasonable expectation." The United Cerebral Palsy Association in Birmingham, Alabama, for example, has conducted pioneering work in placing consumers with cerebral palsy and quadriplegia in highly sophisticated jobs using adapted computers. These experiences may ultimately mean that "reasonable expectation" will be assumed unless proven otherwise.

Classifying Models of Assistive Technology Service Delivery

During the past decade, a number of models for delivery of assistive technology emerged within the public and private sectors. There have also been efforts to classify and describe the advantages, disadvantages and requirements of each (Smith, 1987; McGrew, 1990). Service delivery models may be classified in a variety of ways, depending upon key descriptors. The chart below illustrates this point.

Descriptors	***Examples***
Type of organization	University, hospital, not-for-profit, durable medical equipment supplier, voluntary organizations
Location/geographic area	Decentralized, centralized, community-based
Primary populations served	Special age or disabilities
Technology services	Comprehensive or specialized
Funding sources	Grants, private insurance, third party reimbursement

An understanding of models and their interdependency is essential in planning a comprehensive, coordinated service delivery system. For example, a center-based model can complement its services by adding or coordinating with a mobile outreach service.

Smith (1987) described an excellent method for classifying models using the administrative setting as the key descriptor. A brief description of Smith's seven models will be given without referencing attributes and limitations. Public rehabilitation agencies can strengthen statewide technology delivery services by collaborating with various programs offering different devices and services. Such programs are described by Smith. They are briefly referenced and described here.

Model 1: The Durable Medical Equipment (DME) Supplier

Many DMEs have traditionally provided highly specialized technology services. Over the past few years, some DMEs have expanded their role. Some vendors like Prentke-Romich Company are offering extensive workshops. Others, like Kurzweil, are offering low-interest financing for purchase of their products.

Model 2: The Department within a Comprehensive Rehabilitation Program

Comprehensive rehabilitation programs often include assistive technology services as a department of the larger organization. There are many examples of this model with hospital settings, but the classification is not restricted to hospitals. This approach should be analyzed by planners with respect to gaps that occur in service delivery after discharge from a comprehensive setting. What are the individual needs for ongoing community technology services? Who will provide and pay for them?

Model 3: The Technology Service Delivery Center in a Post-secondary Education Setting

The key characteristic of this model is its strong orientation toward research in an area of specialization for a special population (e.g., communication aids for people with communication disorders). Programs of this model are repositories of state-of-the-art information about their specialty. Rehabilitation engineering centers are good examples of this model.

Model 4: The State-Agency-Based Program

A primary characteristic of this model is legislative authority. These programs are operated by rehabilitation services, public school programs, commissions for the blind, etc. These programs are operationally quite diverse - a broad range of services often across geographically dispersed areas, are provided. Services may be based in a center or delivered in the community with many variations.

Model 5: The Private Rehabilitation Engineering/Technology Firm

This model includes private firms, generally highly specialized, in areas such as prosthetics and orthotics, van modification businesses, and therapists in private practice. Services are often restricted to local or regional areas.

Model 6: The Local Affiliate of a National Nonprofit Disability Organization

Two well-known examples of this model are United Cerebral Palsy and the National Easter Seal Society. These organizations offer programs at regional and local levels which may not include a strong assistive technology component.

Model 7: Miscellaneous Types of Programs, Including Volunteer Groups and Information/Resource Centers

Several programs use this model. In the United States, such programs are an outgrowth of private industry. For example, Telephone Pioneers of North America is comprised of telephone company employees, and Volunteer Medical Engineers (VME) was formed by Westinghouse engineers. The JAN Network is a good example of an information resource center for technology in the work place (see Chapter 6 Information Resources).

Smith (1987) describes attributes and limitations of each of these interdependent models. All models are needed to assure the delivery of comprehensive statewide services. A central issue facing planners is to determine how to weave them into a coordinated and comprehensive delivery system (see Chapter 7: Planning). Understanding the spectrum of assistive technology services provides a foundation for developing a comprehensive delivery system.

Assistive Technology Services Needed for a Comprehensive Model

In working with states funded under the Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act), the staff of RESNA's Technical Assistance Project identified nine service components required for a "comprehensive" assistive technology service delivery model. This spectrum of services is illustrated in RESNA's "State Self-Assessment Tool" (see Appendix G, State Self-Assessment Tool). The term "comprehensive" means that multiple, lifespan, technology-related needs of consumers across disabilities, settings, and cultures are addressed by a range of services provided, purchased or coordinated among public and private agencies. This framework also requires a central focus on the consumer and his/her lifespan technology-related needs across each setting.

These nine assistive technology service components will be described to provide a framework (along with RESNA's "State Self-Assessment Tool") for planning and evaluating comprehensive services of one's agency and state.

Service Components of the Comprehensive Model

1. Outreach to Consumers and Practitioners for Awareness to Seek Technology

Experts agree that there is a need to increase the awareness of consumers and practitioners about technology, where to find it and how to obtain funding for it. Rehabilitation agencies can increase the awareness about the impact and value of technology with practitioners and consumers. Outreach activities must reach underserved and special needs populations. These populations require TTD numbers, alternative formats (e.g., Braille, tape, large print, and languages other than English) for media, radio reading services, exhibits about technology at state fairs and newsletters read by special populations.

Agency outreach and awareness efforts can also be synchronized with interagency and statewide efforts (e.g., technology conferences and fairs). Are several agencies in the state hosting smaller and relatively inconsequential technology conferences or fairs? Could these efforts be combined? Would a mobile technology awareness van and traveling equipment loan and demo library be more effective in reaching people? What about linking with mayors' committees throughout the state to sponsor smaller local technology fairs for the entire community?

2. Current Information on Various Devices and Services

The agency must ask how consumers and agency personnel obtain current information about devices and technology-related services. If no organization within the state is addressing this need, should the agency develop this resource - or, buy into another state's system? (See Chapter 6, Resources.)

3. Assistance in Selecting Appropriate Devices and Services (Assessment)

Assessment of the individual's unique set of functional and cognitive capabilities and interests is a prerequisite to the selection of appropriate technology devices and services. Regardless of circumstances, anyone who applies to rehabilitation services is entitled to individual assessment. However, this assessment process is dimly viewed by some critics as a way to deny services. These critics argue that, too often, rehabilitation practitioners subject consumers to a lengthy battery of medical and psychological testing without explaining its relevance to the rehabilitation process.

A complex technology assessment may not be needed in all cases, e.g., when a consumer is seeking an "off the shelf" solution or equipment is not "medically necessary." The key is *individualization* of the assessment process, requiring full participation of the consumer in determining what that process shall be. Nontraditional experimental assessment is now accepted as the best way for consumers to try out technology solutions.

Extended evaluation should include an assessment of the person's potential to use and benefit from technology. Sufficient orientation and training time in adapting to new technology should be developed in the planning process. Without orientation and training time, new technology can actually hamper test performance. The consumer should make decisions about the time needed to be comfortable in using new equipment. Rigid time lines may not accommodate individual needs. It should be noted that generally, assessment for technology is a process that may occur and reoccur throughout the individual's life span.

Assessment for certain technology to meet medical and home health care needs may occur in a hospital. A different type of technology assessment may occur at vocational assessment or at other transitional points. As the person moves from setting to setting, the desire and need for technology will change.

There are other circumstances that may create the need for reassessment for technology:

- functional improvement may alter the need for a device
- a solution may work clinically but not in the real world
- a solution may become obsolete and unuseable
- needs may change as the person transitions from one circumstance to the next (see Chapter 2, The Assistive Technology Process).

4. *Writing Justifications and Identifying Funding Sources*

Funding to pay for technology is a major obstacle in the view of both consumers and practitioners. Yet, some smaller programs report over 90% success in obtaining funds for assistive devices. Obtaining funding for devices requires perseverance as well as knowledge of the funding culture's language, legal requirements, policies, practices, procedures, processes, and skill in documenting needs for the device with agency language (see Chapter 5, Funding Assistive Technology).

From this perspective, there is no justification not to proceed with purchase of technology determined to be appropriate, necessary and wanted by an eligible consumer after the search for similar benefits has been exhausted (Morris & Golinker, 1991).

5. *Customization and Fabrication*

Off-the-shelf devices will not often meet the unique needs of the consumer. Purchasing a wheelchair from some catalogue may temporarily meet the needs of someone recently discharged from a hospital, but could be detrimental to a consumer with cerebral palsy or spinal cord injury. The incidence of secondary injury among consumers is gaining widespread attention. Secondary injury, in many cases, can be reduced or prevented by the proper use of appropriate assistive technology. Appropriate technology often requires some level of customization to meet the unique needs of the consumer (see Chapter 2, Assistive Technology Process).

Where no commercially or customized device is available, fabrication of a unique device may be necessary. Fabrication can present a host of challenges. Repair and maintenance issues, documentation of specifications, and similar issues face the consumer and fabricator (see Chapter 2, Assistive Technology Process).

6. Installation and Training in Use of Devices

Many devices require installation, integration with other devices, and training. When rehabilitation agencies purchase services, agreements with vendors should identify who is responsible for each of these tasks. Is the computer vendor, rehabilitation counselor, agency rehabilitation engineer or outside agency supplier of technology services responsible for these tasks and what additional costs, if any, will be incurred? It is important that the consumer be informed about lines of responsibility to know who to contact when questions arise. This issue can become understandably more complicated when the agency is required to bid for technology devices such as computers. Commercial computer vendors are not always knowledgeable about assistive technology software and hardware, and may also be insensitive to the needs of consumers. In this context, "training" may take on another dimension-dual training of the vendor and the consumer (see Chapter 4, Training for Assistive Technology).

7. Follow-up to Determine Consumer Satisfaction and Program Evaluation

The technology delivery programs should include regular follow-up services for several reasons. To what extent has technology affected the consumer as a family member, homemaker, student, job seeker, consumer in vocational assessment status, or employee? How does the consumer use the technology? Does the consumer view it as improving his/her quality of life?

Follow-up is essential for fine-tuning services. Often, modifications to the device or the setting in which it is used are needed. Staff must be prepared for these necessary adjustments and time. More formal procedures to obtain consumer recommendations can be used to improve and expand the program.

RESNA's Technical Assistance Project and United Cerebral Palsy associates have developed a consumer follow-up survey instrument in which these organizations cooperate with the first nine states funded under the Tech Act.

8. Repair and Maintenance of Equipment

Equipment repair and maintenance issues are large concerns of consumers. Complex technology will require more frequent service. Only recently have consumers, employers and practitioners fully recognized that practice demands attention to this problem. Considerations include warranties, plans to find repairs and replace obsolete equipment and to upgrade/change software. Perhaps vendors can guarantee back-up equipment as a part of maintenance agreements. Perhaps maintenance agreements can be negotiated for off-the-shelf, customized or fabricated products. Perhaps specifications for customized work can be archived in the case record and with the consumer to ensure that detailed product specifications are available. These are a few ways to address product maintenance and repair issues.

9. Research and Development

New technologies to benefit consumers are introduced every year. Research and development efforts to facilitate this process are important. Some public rehabilitation agencies encourage research and development of new products and applications. In these cases, decision makers recognize the importance of adding to the base of knowledge about new technologies and their impact on consumers and society.

Research and development can be supported in many ways. Financial supports, release time for research activities, agency recognition, and encouragement to disseminate findings at conferences and professional meetings, are powerful incentives to foster research and development services. In particular, dissemination of findings can reduce duplication of efforts and add to the credibility of the agency.

Agency personnel and consumers can improve research and development services by providing feedback to vendors and product developers about their products. Since the field of assistive technology is fledgling, vendors and developers may not fully appreciate the extent of service-orientation and consumer-responsiveness needed to ensure long-term viability of a product. A concerted effort by all collaborators will have a cumulative impact in furthering research and development of appropriate products.

A Checklist for Evaluating Comprehensiveness of Services

Public rehabilitation agencies can determine the comprehensiveness of existing services (e.g., purchased or provided) using the checklist in Figure 3.1. This checklist allows the user to evaluate nine service delivery components with respect to seven specialized technology disciplines.

Factors to Consider in Providing Assistive Technology Services

A variety of service providers and types of agencies may perform technology services in one or more of the nine service components. Certain factors must be considered in developing and/or providing these services. Figure 3.2 provides information for developing each service component of the delivery program.

Comprehensive Services

RESNA's Technical Assistance Project clearly places importance on understanding comprehensiveness of services. This framework requires organizations to be less insular and more complementary in statewide delivery of technology services. For example, center-based services can explore ways to provide or coordinate with community-based technology services. Highly specialized private programs can explore ways to coordinate with other technology programs. This kind of coordination will strengthen the statewide technology delivery system - consumers entering the vocational rehabilitation program will have more of their technology-related needs addressed; and consumers exiting rehabilitation services will have access to a wider spectrum of technology services needed for maintaining independence across their lifespan and environment.

Models of Assistive Technology Service Delivery

The first step in developing assistive technology services is to examine current needs and resources within the state, region and national arena. This process helps planners identify gaps, coordinate with other programs, and replicate models or components of models. These models, along with a broader systems view of a comprehensive, coordinated spectrum of services should be kept in mind when reading Chapter 7 on Planning.

These programs represent a diversity of administrative settings, vocational rehabilitation agencies, university-affiliated programs, community-based independent living programs and private, nonprofit programs to provide readers with a deeper appreciation of the unique contribution each organization makes to the entire service delivery support system. Each program was selected based upon recommendations from experts within and outside of the IRI study group. These models are representative of the diversity of today's environment and do not reflect any attempt to cover all such programs in the United States. The IRI study group recognizes there are many other fine examples of program models that could have been included.

Summaries of Programs Surveyed

(See Appendix H: IRI Survey Instrument)

Program: Alpha One, Center for Independent Living

Address: 85 East Street
South Portland, ME 041106

Phone: 207-787-2189 (voice or TDD)

Contact: Executive Director

Branch Offices: 71 State Street
Augusta, ME 04330
207-623-1115 (voice or TDD)

373 Main Street
Presque Isle, ME 04789
207-764-6466 (voice or TDD)

Acme Business Park
41 Acme Road
Brewer, ME 04412
207-989-6016 (voice or TDD)

Contact: Branch Manager at each location

Description: This exemplary program offers a variety of services to assist consumers of all ages to live more independently. Services include information and referral, peer support, independent living skills training, personal assistance services and a one-of-a-kind $5 million dollar adaptive equipment loan program. Any person (with or without a disability), community organization or business may apply for a loan to purchase adaptive equipment, as long as it assists one or more persons with a disability to improve their independence, quality of life, or become more productive members of the community. Individuals may borrow up to $50,000, based on credit worthiness and ability to repay. Individuals may finance up to 100% of a piece of equipment while businesses may borrow up to $50,000 and finance up to 50% of their costs. The loan program finances a variety of adaptive equipment (assistive technology) including talking computers, vehicle lifts and driving systems, hearing aids, home ramps or elevators, augmentative communication devices, etc.

Program: Michigan Rehabilitation Services

Address: State Office
P.O. Box 30010
Lansing, MI 48903

Phone: 616-664-4461

Contact: Michigan Rehabilitation Services

Description: The Michigan model is decentralized. Provision of assistive technology is woven throughout the rehabilitation process. Emphasis is on accommodation services during evaluation, training, independent living and at the job site. Accommodations address physical, cognitive and affective limitations. Assistive technology is only one type of accommodation service provided.

Program: TRAC and TRAIL (Tri-State Resource and Advocacy Corporation, Inc., and Tri-State Resource and Advocacy for Independent Living Program)

Address: 1090 Chamberlain Avenue
Chattanooga, TN 37404

Phone: 615-622-2172

Contact: Assistant Director

Description: This program is dedicated to assisting people to be as independent as they can be, and in assisting communities to become as accessible as they are capable of being. This consumer-controlled independent living center is controlled by the disabled, for the disabled. The program provides low tech services to consumers across disabilities based upon expressed needs. These services are provided at several satellite locations. The program is using computers with adaptations at one location. Consumers are equal partners in making decisions about technology.

Program: Technology Access Program (TAP)

Address: Georgia Division of Rehabilitation Services
878 Peachtree Street, NE, Room 706
Atlanta, GA 30309

Phone: 404-894-6744

Contact: Rehabilitation Technology Manager

Description: This program provides a consumer-responsive statewide program of technology assistance to increase the independence and self-sufficiency to people with disabilities in Georgia. TAP contracts out for all technology services, but coordinates contractors (TAP providers) to ensure optimal team work. Centralized "expert" technical support and services are provided under contract by Georgia Tech's Center for Rehabilitation Technology. Each of the eight districts across the state have satellites (some CRT-connected, others are private contractors) to provide services in customary settings.

Program: Lekotek of Georgia, Inc.

Address: 3035 North Druid Hills Road
Atlanta, GA 30329

Phone: 404-633-3430

Contact: Director

Description: Lekotek integrates children with severe disabilities into their family through play, assists family integration within the community, and provides therapeutic play intervention to children with disabilities, their siblings and parents. Lekotek is an early intervention preschool, center-based program which operates a toy lending library and quarterly computer classes (CompuPlay). Technology resources are offered to children 0-8 years of age. CompuPlay is for people with disabilities of all ages.

Program: North Carolina Division of Vocational Rehabilitation Services;
Rehabilitation-Engineering Program

Address: P.O. Box 26053
Raleigh, NC 27611

Phone: 919-733-3364

Contact: Assistant Director for Operations and Support Services

Description: This program is a regional/satellite circuit rider model. It is designed to provide supportive assistance to vocational rehabilitation and independent living programs with respect to the rehabilitation engineering and assistive technology needs of clientele. It is designed as a statewide circuit rider program with engineers stationed across the state to provide problem-solving assistance to consumers in customary settings.

Program: Shepherd Spinal Center/Rehabilitation Technology Department

Address: 2020 Peachtree Road
Atlanta, GA 30309

Phone: 404-352-2020

Contact: Rehabilitation Technology Department

Description: This program primarily provides all aspects of technology to patients with spinal cord injuries and spina bifida. Technology includes low tech through high tech devices/services such as lap boards, mouth sticks, environmental control units, and adapted computers.

Program: South Carolina Vocational Rehabilitation

Address: P.O. Box 15
West Columbia, SC 29171

Phone: 803-822-5372

Contact: Rehabilitation Engineering Department

Description: The purpose of this centralized program is to provide assistive technology services to South Carolina vocational rehabilitation clients, including independent living clients.

IV. Conclusions and Implications

A Comprehensive, Coordinated Paradigm
An Emerging Model

In today's environment, successful service delivery is comprehensive, coordinated and integrated within existing programs as a support service. As gaps are identified, service delivery components, such as mobile outreach units, may be added to provide more comprehensive services. Technology services are interdependent - it is not possible to provide single services and expect the consumer to achieve lasting gains.

Each of the following nine service components is required for a comprehensive service delivery equation:

1. Awareness to seek technology
2. Current information on devices and services
3. Assistance in selecting appropriate devices and services

4. Funding identified
5. Customization/Fabrication
6. Installation and training in use of devices
7. Follow-up on consumer satisfaction and program evaluation
8. Repair and maintenance of equipment
9. Research and Development/Technology Transfer

A Broad Spectrum of Services Results in an Increased Likelihood of Successful Outcomes

Failure to address any one component may mean that the technology needs of consumers may not be met. Cooperative agreements with other providers can complement available technology services and will strengthen the overall service environment of the state.

Public rehabilitation agencies also need to determine the extent to which existing services are comprehensive and the type of technology services needed. For example, a spectrum of services is needed for augmentative communication, computer access, adapted environments and wheeled mobility services.

A New Paradigm for Technology Service Delivery

Enders (1989) discusses the need to address "old myths" by replacing them with new models to meet the needs of today's environment. She states:

> The rehabilitation system has traditionally focused its attention on shorter term and/or time limited types of interventions. However, there is now an increased recognition of the importance of ongoing, coordinated support systems such as independent living and supported work. Technological support services and systems play an important role in these new trends that are redefining the entire habilitation/rehabilitation system. Yet, there has been only a single generation of persons with severe disabilities who have benefited from significant technological intervention. We are only now beginning to get a sense of the longer term issues that a comprehensive ongoing support system must address - such as: Where does the next adapted vehicle come from? How do you upgrade computer adaptations to remain competitive in the work force as more sophisticated technology becomes available? What is the rehabilitation agency's role when former clients find they need financing for subsequent generations of equipment? (Enders, 1989).

People who require technology assistance will increasingly need life long support. Each agency involved can contribute toward building a consumer-responsive, comprehensive, technology support system to meet the demands of today's environment by coordinating services with other organizations. Collaboration among programs can ensure that all nine components in Figure 3.1 are addressed in statewide planning efforts.

Landmark legislation signed into law by the President on August 9, 1988, the Technology-Related Assistance for Individuals with Disabilities Act of 1988 (PL 100-407), is designed to assist states in developing comprehensive programs of technology related assistance. The intent of the enabling legislation is to increase the availability of assistive technology devices and services by integrating technology into current programs, and by coordinating the provision of services among public and private delivery systems.

Through this legislation, new models for statewide technology support systems will evolve. A number of states have received Technology Act grants to establish statewide plans for technology support systems with the intent that all states will ultimately be funded.

As the states develop these programs, there will be an increased focus on interagency systems of service delivery -- of "information, financing, implementation and development of assistive technology" rather than on the defects of consumers, and the inability to perform major life tasks (Daniels, 1990). With access to information, assistive devices, equal opportunities and support systems, technological solutions will reshape the business of public rehabilitation agencies. Public rehabilitation agencies serve a variety of people across many disabilities, service systems and geographical settings. The scarcity of public rehabilitation resources requires coordinating among other agencies to provide comprehensive technology services. This issue is considered so critical that the Center for Rehabilitation Technology Services of South Carolina Vocational Rehabilitation Department (Langton & Trachtman, 1989), among others have called for a single technology service network to support the existing programs and agencies.

As the demand for technology-related services grows, public rehabilitation agencies will increasingly look toward pooling resources to provide comprehensive assistive technology services.

A Checklist for Comprehensive Assistive Technology Services

Service Delivery Components	**Specialized Services**					
	Seating and Positioning	*Augumentative Communication*	*Computer Access*	*Recreation and Leisure*	*Adaptive Home Environments*	*Mobility Systems*
1. Outreach Efforts						
2. Information & Referral						
3. Assessment						
4. Funding						
5. Customization & Fabrication of Services						
6. Installation & Integration of Devices						
7. Follow-up						
8. Repair and Maintenance						
9. Research & Development						

Comprehensive Coverage

Yes *No*

___ ___ Across Disabilities

___ ___ Across the Lifespan

___ ___ Across the State (rural/urban)

___ ___ Across Ethnicity

___ ___ Across Socioeconomic Levels

Figure 3.1

Figure 3.2

Factors to Consider in Providing Assistive Technology Services

Service Delivery Component	Who Performs Service?	What Factors Should be Considered in Developing/Providing this Service?
1. Outreach Services	Public Relations Coordinators; Advocates; United Way; Vista Volunteers; Cooperative Extension Service; Churches; Rehabilitation Counselors; Independent Living Centers; Community Organizations	Are outreach services available to consumers of all ethnicities, and to those who reside in underserved rural areas of the state?
2. Information and Referral Services	Information Specialists (e.g., Occupational Therapists; Peer Technology Counselors; Rehabilitation Counselors; Community Workers)	Are information and referral services: Centralized? Center-based with toll-free and TTY access? Available in formats for consumers with different needs and "user-friendly?" Will a centralized or decentralized system be used? Who will develop and maintain current information? What linkages will there be to other state, regional, and national resources? How will the impact/value of this service be assessed?
3. Assessment	Variety of Clinical Practitioners; Independent Living Specialists; Special Education Teachers; Cognitive Therapists; Rehabilitation Engineers/Technologists; Vendors	Will services be center-based, community-based or mobile? Will the model accomplish team-oriented assessment? Is the team consumer-oriented (e.g., Will the consumer be involved as an equal partner in decision-making?)

		Does the vendor have a reputation for objective assessment of needs for technology? Are joint assessment-related recommendations documented in the Individualized Written Rehabilitation Plan? Are follow-up details clearly specified in the assessment report? Are team roles and responsibilities defined (including consumer)? Is there a designated team leader to coordinate service provision and information exchange? Have possible transitional issues been addressed in the assessment process (e.g., less costly device may be appropriate for an educational but not for an employment setting)?
4. Writing Justifications and Identifying Funding Sources	Rehabilitation Counselors: Practitioners; Consumer Peer Counselors: Independent Living Specialists; Physicians	Who will write justifications? Is this person experienced or trained in this skill? What funding resources are available? Are there ways of piecing funding together? Have voluntary funding sources been considered? Do staff have a demonstrated commitment to identify a source of funds? Is recyclable equipment available? Will staff appropriately acknowledge funding sources that have been especially helpful?
5. Customizing and Fabricating Services	Practitioners; Rehabilitaiton Engineers; Carpenters; Machinists; Welders; Blacksmiths; Mechanics; Home Extension Agents; Army Corps of Volunteers; Pioneers of America; Volounteer Medical Engineers; Vendors	What resources are availble to help? Will services be purchased or voluntary? Who will provide materials and supplies? Have liability issues been discussed? What affect will customization of a device have on warranty/maintenance agreements? Who will provide maintenance/repair? Are the specifications documented for reference purposes?

Figure 3.2 (Cont'd)

Factors to Consider in Providing Assistive Technology Services

Service Delivery Component	Who Performs Service?	What Factors Should be Considered in Developing/Providing this Service?
6. Installation and Training	Practitioners; Rehabilitation Engineers/Technologists; Vendors; Special Education Teachers; Home Economists; Fabrication/Customizers; Software Specialists; Parents; Advocates; Peer Counselors	Who will install and integrate devices with other technologies used by the consumer? What level of training is needed by the consumer (orientation, supervised initial use, repeated practice, in-depth, overtime skill building?) Who will pay for training? Does the trainer use different approaches to accommodate different needs and learning styles?
7. Follow-up	Practitioners; Vendors; Rehabilitation Counselors; Peer Counselors; Special Education Teachers	Is the device being used? Is it being used appropriately? If not, why not? What impacts have resulted from using assistive technology? Does the device need adjustments? Is additional training needed? If the device is not being used properly, or at all, which reason(s) apply? __ Not appropriate device for consumer __ Not appropriately integrated with other devices or the environment __ Consumer and/or family were not decision-makers in selection process __ Not trained, inadequately trained __ Malfunctioning device __ Circumstances have changed If the device is being used (e.g., used properly), what impacts have occurred?

		__ Increased independence in one or more areas of life __ Increasing integration into family, community, school, work or recreational activities __ Increased safety, fewer accidents __ Improved grades, work performance __ Prevention of secondary injury __ Consumer satisfaction with device
8. Repair and Maintenance	Consumers; Practitioners; Vendors; Fabricators	Were plans made prior to discharge, closure, concerning repair and maintenance issues? __ Likelihood, frequency and type(s) of breakdowns anticipated __ Roles, responsibilities, and expectations of consumer, employer, teacher, counselor, regarding repair and maintenance issues __ What costs are expected? __ Who will repair and maintain? __ Will maintenance reduce repair needs? __ Maintenance agreements __ Who will pay cost/coverage? __ Software backup systems
9. Research and Development	Rehab Counselors; Consumers; Practitioners; Independent Living Specialists; Peer Counselors	Will decision makers encourage research and development efforts? What kind of research and development is encouraged? __ New applications of existing technologies __ Research and development of new technologies __ Vendor/developer testing of new products __ Feedback to vendors and developers regarding products __ Seeking additional state and federal support for research and development acitivities __ Dissemination of research and development findings at conferences and professional associations

CHAPTER FOUR

Staff Development and Training In Assistive Technology

I. Objectives:

1. to provide basic concepts that can be used for training staff in the proper application of assistive technology
2. to consider learning through the process of problem solving as the method of choice using a team approach involving consumers, practitioners, policy makers, and others
3. to discuss the training of consumers, staff and others on the various products which are available as well as their proper selection and use

II. Summary

This chapter includes suggestions on methods for training staff on the basics of technology as it relates to people through a process of learning techniques of problem identification, analysis, and solution. This process is a multidisciplinary team approach with strong consumer involvement. Case study samples are suggested as the major learning tools in which staff experience problem solving that evolves from real issues in the field (see Appendix D). It also includes suggestions on how vocational rehabilitation (VR) may be of assistance in training related professionals such as teachers, employers, family, and others. Ideas on approaches and methods to train consumers on technology are suggested through consumer organizations, communication with families and using the media. Finally, the reader is provided with a suggested method of recording information on procedures and solutions for future use and for networking.

III. Discussion

The Basis for Training

There is not a "standard" curriculum that can be used for training rehabilitation practitioners in assistive technology. However, professionals in the field will benefit from basic knowledge regarding the most effective and economical approaches to solving problems through technology. Teaching practitioners basic concepts of applied technology and how that technology relates to people is a good place to start. One excellent introduction to the concepts of human interface with technology is Tichauer's (1978) The Biomechanical Basis of Ergonomics. Tichauer's anatomical approach provides for a basic understanding of the biomechanical levers at work in the human body and how they relate to and extend to the external dynamics of work tools and equipment. The book also includes an excellent glossary which clearly defines engineering terms for the layperson.

In addition to basic human factors, practitioners may benefit from learning basic electrical and mechanical principles which relate to typical assistive approaches or technology. These resources exist in most libraries and range from texts on the fundamentals of electronics to sample hydraulics. Some state agencies and counselor training programs have used basic physics courses or incorporated the essentials of physics into training for staff in an effort to provide fundamental support. Although the general nature of rehabilitation practitioners is that of a strong orientation toward people rather than things, it is necessary to provide an awareness level of technology or Basic Tech 101 (with a humanizing aspect). Whatever methods, materials or resources are used to provide this basic introduction the training should focus on problems technology can solve for people rather than an in-depth study of the technology itself. The questions must always be asked, "How can this information help me to best use and understand assistive technology?".

Problem Solving and Analysis

The practice of problem solving is among the best methods of learning to apply assistive technology as it involves creativity and skills. Knowledge is increased by reading but skills are only developed through practice. The most important part of problem solving is the generation of ideas. The more ideas generated the better as they open up more options. Problem solving can be thought of as both a divergent and a convergent thinking process. A precaution is, when generating ideas (divergent process) one must resist the temptation to evaluate or judge the ideas presented (convergent process). The generation of ideas must be free and open which explains why a team approach to problem solving, "think tanks" and "brainstorming" works so well.

A key component in the team process of problem solving is gathering information for accurate problem identification. The consumers are the most important members of this investigation. Their cooperation and involvement are essential for success. Other team members may include family, teachers, doctors, therapists, employers, et al. This approach differs from the traditional medical model where the professional is totally responsible for correcting a patient's problem. Instead, team problem solving focuses on empowerment of consumers. Experience has demonstrated that, if the decision maker does not have to live with the technology, choices tend to be made that do not fit the consumer's environment, preferences, culture, or life style.

Gathering information for accurate problem solving can be difficult if the right questions are not asked. General background information is needed about the consumer including abilities as well as problems. All of the interactive environments must also be kept in mind such as home, school, work, community, culture, and recreation. This is in keeping with the same model presented in the introduction of this document. Probably the first question to ask the consumer is "What problems are you having and what do you think you need to solve them?" This initial stage can be thought of as a divergent one in the creative thinking process.

Using Sample Case Studies

Using sample case studies can be an excellent learning tool for training staff. An example of a case study which may be used for training is included in Appendix D (see "Brian"). Case studies have the advantage of being based in reality and one must be careful that this element is not lost in the process of preparing them as learning tools. Begin by choosing a case which has a number of critical points requiring the professional to make choices or decisions before proceeding. The case can be formatted in such a way that staff will experience, to a certain extent, the problems and crisis resolutions typical of the process of applying assistive technologies. Typical elements include problems associated with cost or funding of assistive devices as well as maintenance, durability, and other factors. Elements may also be specific to an individual state in terms of policy issues and specific coding of devices. A case may be altered to provide for different demands on the learner or be made up of pieces from other cases as long as the story makes sense and maintains its basis in reality. For instance, when developing the sample case the trainer may wish to add a realistic choice or build in a pitfall. Further, the trainer should consider adding options which do not call for an assistive device but rather a rearrangement of environment, work materials, or other non-hardware approaches.

Sample case studies can be developed to the point of learning packages or even games. An example is given in Appendix D of a case study carried to such a point. It is called "Sandy Smith Accommodation Maze" and it sets the learner off on a number of different directions depending upon what decision is made. An approach to generating ideas and establishing priorities called "The Nominal Group Process" has been developed by Dr. Michael L. Moore of Michigan State University (1987). This method provides a structure by which issues and problems may be listed, ranked, and prioritized by means of a voting process.

The case study can also be formatted for breakout groups in seminars and workshops to practice group decision making and to compare solutions recommended with those of other groups. Seminar planning may include that counselors bring their own cases for review. It may also include a group structure which pairs counselors with state policy experts to review options. Such an involvement of policy makers would demonstrate the reality of policy impact on providing services. For content on policy and funding issues see Chapter 6.

Training Related Professionals

The role of providing assistance training or information on assistive technology to related professionals begins with the nucleus of the team concept and expands to all individuals in the consumer's environment. It also includes providing feedback and information to state agency administrators, directors of field operations, regional RSA commissioners, and others who set policy or plan for the development of programs and the education of professionals in the field. The methods used to train vary according to the nature of the audience. Figure 4.1 illustrates how the various methods may relate to certain audiences.

Figure 4.1

Applications of Training Methods

METHOD	AUDIENCE				
	STAFF	EMPLOYERS	SUPERVISORS	CONSUMERS	PUBLIC
Video or On-Site Tour	Used to Demonstrate Range of Assistive Technology	→	→	→	→
Print	Resource Information	→	Concepts, Resources	Concepts, Resources, Products →	→
Case Study	Example for Training	Used to Illustrate			
Problem Solving Activities	Excellent Tool for Applying Information	→	→	→	→
Basic Lecture and/or Demonstration	Terminology, Equipment, Basic Concepts	→	→		
Discussion Groups	Exchange of Ideas, Issues	→	→	May be Useful in Discussing Specific Issues Such as Limitations	

Teachers

Teachers or special educators should be team members and provided with information to help them become knowledgeable of and be able to apply the kinds of technology in the classroom which follow the transition from career and life planning to employment. For example, if an adaptation is provided in the classroom for a student to operate an Apple computer, that adaptation should be chosen or designed so that it also works with other computers such as IBM. Many obstacles can be eliminated by early communication and collaboration with educators.

Employers

Employers need training and information ranging from reasonable accommodations to compliance with the Americans with Disabilities Act (ADA). There are some good resources to present to employers on providing accommodations. McCray's manual (1987) entitled The Job Accommodation Handbook presents a wealth of information on employers and accommodations. It includes forms and worksheets for analyzing jobs and then making accommodations as well as explanations of terms and legal concerns. Materials and assistance can also be obtained from the Job Accommodation Network (JAN) discussed in Chapter 6. Humanscale 1/2/3 (Diffrient, Tilly, & Bandagjy, 1974) is a concise easy to use packet of information and turnscales with an impressively condensed amount of data on measurement and design parameters.

Approach employers with regard to their insurance and safety concerns. Solicit questions from employers on those concerns and plan to use assistive technology in a way which does not adversely effect them. For instance, if a modification is called for which requires the alteration of a piece of machinery or equipment, extreme care must be taken to insure that the result does not expose the consumer or other workers to new hazards. Be prepared to negotiate options for mutual agreement.

Supervisors and Co-workers

Supervisors and co-workers are other important groups in a consumer's work environment. They are often asked to employ or work with persons with disabilities without information and awareness of the nature and effects of disability. When they become knowledgeable of the problems associated with a consumer's disability they can be helpful in applying assistive technology in their particular work situations. It should be the role of the rehabilitation practitioner to convince employers of the importance of training supervisors and co-workers. One approach might be to take them aside in a company meeting room to discuss the situation and field their questions and concerns. An excellent resource for setting up an awareness meeting is a collection of materials from The Pine Lake Project (Honnick, n.d.) available from the State Technical Institute and Rehabilitation Center, Plainwell, Michigan. This package contains information and planning materials for orienting people to disabilities and providing awareness training.

Teaching and Informing Consumers, Parents, and Physicians about Available Technology

A private corporation wishing to purchase a particular new appliance should be able to determine how to market the appliance. Rehabilitation practitioners need to market information on available technologies not only from a sales, but also an awareness standpoint. Using the media, especially television since it is so pervasive, is an effective way to inform customers and the public at large about successful applications of assistive technology. Although brief, local events spots and human interest stories can enlighten and enhance awareness of technologies available. Repeated calling will usually result in the arrival of a roving video crew from a local television station, complete with novice reporter to cover your story on some new "miracle of modern technology" and therein lies a problem. The media tends to emphasize high technology instead of the more common, simple solutions to problems. It is the role of the rehabilitation practitioner to strike a balance with the media in showing an equal emphasis on simple (yet effective) solutions.

Consumer groups and organizations are other avenues to pursue in communicating information about technology. Consider contributing to newsletters with information about technology and participating in events where it is appropriate to display or tell about what is available. Encourage peer to peer relating of experiences. When speaking to groups about devices and other adaptations it is always helpful to use color slides or video.

Reaching city/county medical societies/boards is important. These groups offer communication links to doctors who are an important target group and often difficult to access. Networking with these groups and their associates and others may be beneficial in approaching doctors and other medical staff with information such as pamphlets and reports regarding services available such as customized seating and other beneficial technologies. Involvement with most community organizations will be beneficial to the purpose of providing general knowledge and awareness of assistive technologies.

Training Consumers

Besides professionals and others, consumers need to be smart shoppers in selecting and evaluating assistive technology options. After searching for and gathering ideas and information on possible technical solutions the selective, valuative, or judgement process begins. In training consumers emphasis should be placed on selection of the simplest and most economical, versatile, normalizing, and least conspicuous option. There are many questions to be asked of the options generated. The following is a list of some of those questions which could be used to develop a checklist for training counselors to be informed consumers as well as training consumers themselves.

BASIC QUESTIONS TO ASK ABOUT CHOICE OPTION
What will it accomplish? What problems will it solve?
What are its limitations?
What are the advantages of this approach?
What are the disadvantages of this approach?
Is it flexible enough for changes in the person's disability over time?

QUESTIONS ON CHARACTERISTICS AND FEATURES

Is its general appearance acceptable and desirable?
Is it comfortable and conforming personally and environmentally?
What are its safety features?
How safe is its use in the context of its application?
What are the dimensions and weight and how are they important?
Is it washable?
Is it intended for use indoors and/or outdoors with inclement weather?
What special features does it have that make it more desirable?

QUESTIONS ON AVAILABILITY AND PURCHASE

How does its cost affect the ability to acquire (see Chapter 5)?
Is a prescription necessary?
Has it been on the market long enough to establish itself?
Are references available from past or present users?
Is it a stock item or does it have to be made to order?
What is the return policy?
What are the conditions of warranty?

QUESTIONS ON EXAMINATION AND USE

Is there a demonstration available?
Is there an opportunity to see it being used by others?
Are there other facilities/agencies now using it?
Has it been field tested? If so, by whom?
Is its operation complicated beyond user tolerance?
Is user training available? If not, who does the training?

QUESTIONS ON WEAR AND UPKEEP

What is its expected lifetime?
What is the frequency of repairs? (reliability for constant uninterrupted use)
What is the required service and maintenance and who does it? (service by dealer vs factory service convenience and time element)
How far must one travel to obtain service or repairs?
Is there adequate, understandable, maintenance information for the user?
Can the user fix or adjust it? Is there someone else who can do it for them?
Is there a loan or substitute available during repair?

TECHNICAL QUESTIONS

Does the type of electrical system require batteries, battery charger, AC adapter, etc.? (specialized expensive batteries)
Does it use standard components and values, i.e., switches, software, hardware, voltages? (AC/DC, 110 volts, AC, 6 volts, 12 volts DC)
What is the type of power system (hydraulics, pneumatics) and what kinds of advantages or problems are associated with its use?
Is it compatible with other equipment or methods currently in use by the consumer? (cords, connectors, attachments, tools, equipment, machinery, etc.)

Any information regarding consumer feedback about a particular approach is always important to note. This can provide for some actual knowledge of what works and what doesn't work and can provide for a better understanding of the affective nature of an option such as "Why it made me stand out from the crowd."

Additional information and resources on evaluating the technology may be obtained from Chapter 4 of the "Assistive Technology Sourcebook" (Enders & Hall, 1990).

Train to Report

Once successful solutions are found through the application of assistive technologies, a policy of recording those efforts is needed to prevent unnecessary duplication and for future reference. The reason for staff training in keeping such a record or report are two-fold: When gathering information for solving a new problem it is helpful to review reports of similar applications. Such a record is also useful when networking with other professionals faced with similar challenges who may benefit from such experience. Videotaping results can be useful for further illustration.

The content of the report should contain a general description of the problem presented, a list of objectives or recommendations, and a description of the results or outcome. Files may be classified according to applications such as computer use or work tools. A statement on referral reason may also be useful. An example of a report from a rehabilitation engineering provider is included in Appendix D, case #357.

IV. Conclusion

This chapter has attempted to provide the reader with some concepts and approaches for training staff and others to solve problems through the use of assistive technologies. It is hoped that when planning for training staff the ideas presented here will prove beneficial to that overall effort.

CHAPTER FIVE

Financing Assistive Technology

I. Objectives:

1. to provide rehabilitation practitioners with strategies for analyzing and acquiring funding for assistive technology
2. to examine issues surrounding the funding of assistive technologies for consumers who are disabled
3. to collaborate and coordinate efforts with other agencies and organizations to provide funding for assistive technologies

II. Summary

Rehabilitation practitioners must understand the complexities of technology in order to make intelligent decisions regarding the opportunities this area provides for clients with severe disabilities. These practitioners must also be knowledgeable of the funding sources this chapter explores as well as ideas and methods for gathering information, removing barriers, developing funding strategies, and examining various policies and procedures impacting on funding today and in the future.

III. Discussion

The 1990s will be a period of opportunity for persons with disabilities to make great strides in personal achievement. However, it will also be a time of uncertainty as to adequate resources to pay for needed equipment and services. Technology has advanced to a level where many individuals who are severely disabled can compete with nondisabled peers in training, employment, and recreational activities. It is for this reason that these technologies must be accessible to the majority of consumers who are disabled. The distribution and funding issues of technology must be addressed if consumers are to achieve employment and/or to enjoy productive lives.

Removing Funding Barriers

There are several ways that barriers to funding assistive technology may be reduced. Assistive technology must be defined and an awareness created in terms of what it can accomplish when used for children and adults with a wide range of cognitive and/or physical disabilities. In the home, the classroom, the workplace, and the community, assistive technology is providing creative solutions which enable individuals with disabilities to be more independent, self confident, productive, and integrated into the mainstream. The major obstacle is not the funding of research and development of new technologies, but rather the funding to provide these devices and services to individuals who need them. Assistive technology can alleviate many problems faced by persons with disabilities in their daily living activities.

Removal of barriers to funding assistive technology may also be accomplished through the involvement of persons with disabilities and parents in the decision-making process to identify the most appropriate technology to enhance functioning. Through consumer involvement in the multidisciplinary process, the entire decision-making team can increase awareness of what types of technology devices and services exist but are not funded. Coordination of efforts can often result in the addition of services, including assistive devices, which might not have been possible without a team approach.

It is clear that assistive technology is a means for persons with disabilities to become more independent, productive, and integrated into the community. It is more than an adaptive device or special equipment. Application of assistive technology involves awareness, assessment, training, practice, maintenance and follow-up. Increased awareness of what is possible and what is appropriate will assist in removing barriers to funding assistive technology on an individual, local service, and systems basis.

Understanding possible state and/or federal funding is very important. The challenges are to identify the entry points of a particular funding source, find the connections to other funding options, and learn the ways to avoid obstacles that delay or deny payment for assistive technology. Removing barriers to funding technology are accomplished by changing regulations, amending state plans, refining interagency agreements, developing new policies and procedures, and revising the day-to-day practices as they affect the user of individual technology. Further, all potential stakeholders, i.e., individuals with disabilities, parents, providers, professionals, technology manufacturers and dealers, and state agency officials must be involved.

Developing a Funding Strategy

When developing a strategy for funding assistive technology, a list of questions must be developed, including services that complement technology. Some questions may include:

1. What is the most promising funding source?
2. Has this source been dealt with before?
    a. Was it successful?
    b. What problems were encountered?
    c. Who was the contact person?
3. Is there a possibility of more than one funding source?
4. Will the vendor be an advocate and provide pre-approval and billing services?
5. Are there persons with disabilities using these devices, and can they be contacted for suggestions on their proper use?
6. Will the device enable the consumer to enter or continue employment, live more independently or improve overall health? Can the funding source be convinced of this advantage?
7. Are written policies of the primary source available?
8. Is it possible for two different funding sources to coordinate cost?
9. If a person has a disability as the result of a job-related accident, is the device the responsibility of workers' compensation insurance?
10. Will a civic or charitable organization, foundation, or association help raise necessary funds?

The answers to these questions will be unique for each individual and may depend on factors such as severity of disability, age, education, employment status, insurance coverage, and geographical location.

Once the questions above have been answered, more specific questions need to be addressed. Such questions include the following:

1. Is technology necessary?
2. What type of assistive technology is indicated and what degree of improvement can be expected?
3. Where can this assistive technology be obtained, how much does it cost, and can it be rented?
4. What services are needed to prescribe, train, and follow-up with the aid or device?
5. What professionals are available who can help justify the medical necessity for the assistive technology?
6. What is the warranty? Does the equipment manufacturer or local vendor provide any special assistance?
7. Is there a case manager assigned to the case, or how can one be secured?
8. If there is no case manager, who can help advocate for the consumer's needs?

During the development of the funding strategy, other questions will arise. However, it is crucial that accurate information be secured in this ongoing process. The right information must include what are the most appropriate assistive technology and services for the individual, rather than what is the most affordable.

Another important component in the funding process is to organize personal information regarding the individual. Some of the information will include:

1. Basic client information.
2. Families employment status and insurance coverage.
3. Disability or medical diagnosis.
4. Characteristics and onset of disability.
5. Education and employment accommodation needs.
6. Public services provided to date.
7. Information on assistive technology needed.
8. Reasons why the device requested is more appropriate than alternatives.

Other attachments which may be needed are a physician's statement or prescription, letters of support, back-up documentation, and/or a picture showing the individual using the assistive device.

Working with the Funding Source

It is important to remember that there is no single way to assure funding when working with a funding source. A number of existing sources that have funded assistive technology previously are in process of re-examining their policies and procedures. The development of new guidelines for these sources may be very helpful in obtaining funding in the near future for assistive technology.

However, a strategy used to fund a particular device may not be successful in funding another device or a strategy used to obtain funding in one state may be unsuccessful in another. Further, the funding source may be apprehensive to fund assistive technology that is relatively new and unknown.

Effective ways to work with a funding source are to have a well-planned strategy, sincere respect, and much patience. Recommendations on how to be diplomatic while being persistent include:

1. Be polite, yet assertive.
2. Communicate in writing whenever possible.
3. Maintain regular continuity with the funding source to avoid time gaps between communications.
4. Direct letters or calls to the same person each time so as to encourage a positive working relationship.
5. Offer cooperation and willingness to provide medical evidence of the need and how the device will benefit the consumer and the funding source.
6. When questioned, try to educate and inform in an assertive fashion while emphasizing the long-term benefits to the consumer.
7. Never threaten legal action as this is heard often and will not intimidate any agency or insurance company.
8. When someone helps a great deal in obtaining funding, express sincere thanks and appreciation.
9. Thoroughly document all written and verbal communications. Although respect and patience are essential, the contact person must also be persistent and have a great deal of endurance when working with a funding source.

Understanding Policies, Guidelines, and the System

Various funding sources have distinct orientations and requirements which require wording the justification for a device or service in specific terms, and/or within certain guidelines. For example, to secure funding from vocational rehabilitation, the individual with a disability must emphasize to the rehabilitation counselor that a specific device will be critical to independent living or competitive employment. Conversely, if parents are looking to the school district to fund assistive technology for their child, justification must be written to verify that the device meets the needs of the child to obtain an appropriate education. Finally, for a funding source such as Medicaid, the device must be justified as a medical necessity and be prescribed by a physician. Terminology used in an application to a funding source for assistive technology could mean the difference that results in success or failure in the authorization process.

To understand how assistive technology is regarded by various funding sources, the contact person must be aware of specific requirements. Medicare will rent or purchase some durable medical equipment if it is medically necessary for the treatment of an illness or injury to improve the person's functional limitations. Also, the charge for the equipment must be determined to be the reasonable and customary rate. Private insurance companies often employ the same guidelines established by Medicare. Private insurance will not fund assistive technology for a client with a condition that occurred prior to the effective policy date. Medicaid provides for rehabilitation services that include any medical and remedial items and/or services prescribed for a client by a physician or other licensed practitioner of the healing arts. This action must be by a licensed practitioner as defined by state law and for the purpose of maximum reduction of physical or mental disability and restoration of the individual to his/her best possible functional level.

Systems Funding Assistive Technology

To understand the processes involved in funding assistive technology, it is important to know there are *three major systems* an individual or family may look to for financial assistance. Individuals with disabilities can possibly utilize *federal/state funded programs, private insurance, or nonprofit agencies* with a mix of public and private support. Inter-relationships between these three systems may arise when trying to secure funding for assistive technology.

The majority of federal assistance flows to the individual states and is based on submission and approval of a state plan. A *second* type of funding is made and received directly by individuals who are severely disabled. The *third* kind of assistance is received directly by a state, a non-profit agency, a university, or any non-profit entity such as a school district through a successful grant application on a specific subject or program priority.

Most federal laws require that expenditures of funds be approved through a state plan and approved by the assigned federal agency. Each federal law will list requirements to be met by the state and to be described in the state plan. A typical list of requirements includes the following:

1. Designate the state agency to administer the plan.
2. Describe the scope of services to be provided.
3. Describe services and priorities.
4. Provide assurances that the individual program planning and requirements are met.
5. Provide for financial assistance by the state.
6. Provide assurances that procedural safeguards and an appeal process as required by law will be implemented.

Funding for assistive technology is easier to acquire if the contact person understands state requirements in order to access federal assistance. To receive these funds, states are required by law and regulations to provide certain services and follow specific procedures. In addition, states may have the option to choose from a menu of services as well as who will be eligible for services.

Consumer interest, expectations, advocacy, and organizations can change laws, policies and practices. There are different approaches for changing practices or policies, e.g., a director or supervisor may have the authority to do so at a local or state level. Changing laws and regulations will take time, however, and will require the support of individuals and groups with similar interests.

Sources for Assistive Technology Funding

Figure 5.1 represents a synopsis of major funding sources for acquiring assistive technology, including the legal basis, eligibility and payment policies. Rehabilitation practitioners in providing assistive technology services may find that they will have to make use of more than one source in order to obtain the device needed by the consumer. Related disciplines (e.g., Independent Living Programs, Client Assistance Programs, etc.) might find Figure 5.1 on funding for assistive technology useful for certain individuals they serve.

Figure 5.1

Major Payment Sources for Assistive Devices

FUNDING PROGRAM	LEGISLATIVE/LEGAL BASIS	ELIGIBILITY	EQUIPMENT PAYMENT POLICIES
Credit Financing	Federal Reserve Regulations including anti-discrimination law (Regulation B), and Truth in Lending Law (Regulation Z).	Based upon applicants credit history, collateral used to secure the loan, and other assurance of likelihood that loan will be repaid.	Some equipment that would be difficult for bank to resell in event of default may need to be secured in other ways. Borrower, however, basically determines what is to be financed.
Medicaid	Title XIX of the Social Security Act.	*Categorically needy* persons who are eligible for AFDC or Supplemental Security Income programs. Some States cover *medically needy* whose incomes, after deducting medical expenses, fall below income threshold.	Varies from State to State. Generally follows Medicare policies. Most States pay for Home Medical Equipment (HME), many pay for prosthetics and orthotics. Augmentative Communication paid for by growing number of states. Medical necessity is critical factor for payment.
Medicare; Part B	Title XVIII of the Social Security Act.	Persons who are: • 65 years of age or older • Under 65, but disabled severely enough to qualify for Social Security Disability Insurance (SSDI) for at least 25 months.	• *Durable Medical Equipment (DME):* equipment which (a) can withstand repeated use, **and** (b) is primarily and customarily used to serve a medical purpose, **and** (c) generally is not useful to a person in the absence of an illness or injury; and (d) is appropriate for use in the home. • *Internal prosthetic devices* • *External braces* • *Artificial limbs or eyes*

IV. Implications and Conclusion

Clearly, the public systems are currently unable to meet the financial needs of consumers who are disabled, nor can they be expected to offer increased resources in the future. While education of third party payers will change some guidelines for reimbursement, there are many consumers who will not be eligible for these programs. For those consumers who may have some of their own financial resources, and who, with the use of appropriate technology, can become productive members of society, strategies for financing, consistent with "normal" avenues of payment, must be found. Consumers, families of individuals who are disabled and advocates must take proactive roles to create alternative financing systems. Funding resources that are available to help purchase assistive technology, and gaps where such resources fail to respond to the needs must be identified. All interested parties must participate in the process of designing, implementing, and sustaining these new programs. Banks, manufacturers and vendors, employers, state agencies, non-profit corporations and consumer advocacy groups all need to participate. The various disciplines cannot afford to wait for one party to assume the responsibility.

Figure 5.2

Major Payment Sources for Assistive Devices

FUNDING PROGRAM	LEGISLATIVE/LEGAL BASIS	ELIGIBILITY	EQUIPMENT PAYMENT POLICIES
TEFRA	Tax Equity and Fiscal Responsibility Act of 1982 Birth through 6	Provides coverage for children deemed diagnostically eligible (as established by SSI definition), but would be financially ineligible for SSI due to parent income. Children must meet medical necessity requirements for institutional care.	The intent is to provide the necessary services, to include equipment for the child to remain in the home versus institution.
Private Insurance • Health Insurance • Disability Insurance • Liability Insurance • Self-Insured Emplolyers' Insurance	Insurance Contract	Persons recognized as beneficiaries/ dependents under particular insurance policy.	Depends upon the terms of the contract. In some cases, such as with eyeglasses, equipment is specifically excluded. Often equipment is not explicitly specified in conctract. Payment then depends upon insurer's legal obligations, and the role of the desired equipment in meeting those obligations.
Federal/State Rehabilitation *Title I* VR Services *Title VI* Supported Employment *Title VII* Independent Living *Title VIIC* Independent Living (Elderly Blind)	Rehabilitation Act of 1973 and Amendments (Title I)	Working age persons who are disabled and have some potential to benefit. Emphasis on persons with severe disabilities. Other Titles of Rehabilitation Act stress Independent Living/Supported Employment, where vocational potential is not the determining factor.	Equipment that is justified as expediting goal of vocational placement. Usually purchases reserved for clients who are at least *job ready* (Title I). In many States rehabilitation agency retains ownership to equipment.
Special Education	Education for All Handicapped Persons Act (P.L. 94-142) and Amendments Chapter I (Elementary and Special Education Act)	Children with disabilities aged birth through 21.	Equipment that is justified as expediting educational goals of students. Also now responsible for meeting the family support needs of families with preschool aged children. In many States equipment is owned by and remains at the student's school
Veterans Administration	Title 38 of the U.S. Code	Veteran's service/financial status: *Category A:* Service connected veterans, or non-service connected, but with income below $15,000 (single) $18,000 (with dependent). *Category B:* Veterans not in Category A, but with annual income below $20,000 (if single); $25,000 (with dependent). *Category C:* All other veterans.	Equipment is paid for when deemed part of overall medical or rehabilitation intervention, which is dependent upon eligibility status. VA pays for such equipment as sensory aids, prosthetics and orthotics, mobility and transportation equipment, etc. when deemed necessary. Benefits provided to Category B veterans on an as-available basis to Category C as-available, with some co-payment required.
Workers' Compensation	Individual State Workers' Compensation Laws	Workers covered under employer's workers' compensation policy, as mandated by State law.	Many states require physical and vocational rehabilitation benefits as means of helping return injured workers to the workplace. Equipment is often purchased as part of the rehabilitative process when deemed cost-effective.
PASS	Plans to Achieve Self-Support (Pass SSA Circular 05-09-SSI)	The PASS provision is an income and/or resource exclusion that allows a person who is blind or disabled to set aside income and/or resources for a work goal such as education, vocational training, starting a business. PASS funds do not count against supplemental security income (SSI) or resource limits, a PASS can enable an individual to maintain or establish SSI eligibility when the individual would otherwise be ineligible due to excess income or resources. A PASS can also be used to increase an individual's SSI payment amount (when income is excluded). In each instance, the PASS can help the individual meet the costs associated with reaching the occupational objective.	Individuals can set aside funds to purchase work related equipment i.e. a computer or other assistive devices.

CHAPTER SIX

Resources for Assistive Technology

I. Objectives:

1. to provide the reader with strategies for finding and using resources in the field
2. to suggest the use of resources which are available in a particular community
3. to discuss the use of information resources and technical assistance from related disciplines and other professionals

II. Summary

This chapter includes a discussion of methods for obtaining and using national sources of information on products and technology related services. It also includes ideas for finding and using locally available persons, products, and services. Gathering information and obtaining assistance through networking with teachers, employers, medical and other professionals is discussed, followed by suggestions for developing a resource plan as a foundation from which to operate.

III. Discussion

The information presented here covers a variety of assistive technology including databases, community and local sources, colleges and universities. Rehabilitation professionals should be aware of these resources in order to develop a resource plan that will best meet the need or needs of each consumer.

Sources of Information

Gathering and using national sources of information on products and technology is necessary to establish a groundwork for operating when in search of solutions through assistive technology. Perhaps the best and most up to date comprehensive guide to nationally based sources is the Assistive Technology Sourcebook by Enders and Hall (1990). This book not only contains an enormous amount of resources and references, but also includes comments and evaluations of most of the entries. No other single source of such information exists today, and it is a must for the desk of any rehabilitation professional involved with seeking information regarding assistive technologies. Much of the information collected nationally about assistive technologies is on databases. The databases are naturally the most efficient way to collect and store the vast amount of information available on aides and devices.

Other National Sources

There are many other databases in existence which contain assistive technology related information. It is important to note that access to a national database such as ABLEDATA is not a prerequisite to success in locating appropriate assistive technologies. The emphasis should always be on what questions need to be asked up front before searching nationally or even locally. There are several newsletters and other forms of information available from specific organizations and private companies, most of which are free upon request. Examples of newsletters are:

The Rural Exchange from the Research and Training Center on Rural Rehabilitation Services, 33 Corbin Hall, University of Montana, Missoula, MT 59812; and
Current Expressions available from the Prentke Romich Company, 1022 Heyl Road, Wooster, OH 44691.

Agencies and organizations can request to be placed on a mailing list for future issues. The RTC Rural conducts research to discover and develop devices that are durable, affordable, and suitable to the needs of people with disabilities in rural areas. The Prentke Romich company has a well established reputation over the years for producing electronic systems for environmental control, communications and many other applications. Other interesting and useful publications and materials include:

ABLEDATA Update available from ABLEDATA. Provides up to date information on the system and other data bases in development is available from 181 East Cedar Street, Newington, CT 06111.
Accent on Living, featuring articles on technology and regular column on new products and services, is available from Cheever Publishing Company, P.O. Box 700, Bloomington, IL 61701.
OnLine, the newsletter of the Rehabilitation Technology Association, is available from the West Virginia Research and Training Center, One Dunbar Plaza, Suite E, Dunbar, WV 25064.
Newsbrief, the official Association for Children and Adults with Learning Disabilities newsletter, covers current techniques in the field of learning disabilities. Available from ACLD Inc., 4156 Library Road, Pittsburg, PA 15234.
The Explorer Program contains packaged materials and videotapes for exploring the world of assistive technologies. For a descriptive brochure, contact the Arkansas Research and Training Center in Vocational Rehabilitation, P.O. Box 1358, Hot Springs, AR 71902.

In addition to the suggested items there are many newsletters, resources, catalogues, and materials to which related disciplines such as special education have exposure. For example, a current comprehensive resource directory may be acquired free from the National Clearinghouse on Postsecondary Education for Individuals with Handicaps by calling or writing to the American Council on Education. Also available are several moderately priced publications regarding vocational training and employment of special needs students from the Vocational Studies Center, 964 Educational Sciences Building, 1025 West Johnson Street, Madison, WI 53706. You may write or call for a free catalogue.

Industrial Supply Catalogues

When looking for work related equipment, there are catalogues available from nationally based supply companies which list thousands of tools, equipment, machinery and other supplies for general use in industry. Although not rehabilitation related, some of these products may provide for appropriate alternative solutions not otherwise recognized. For example, a different hand tool might be the answer to a person's inability to perform a task rather than some specially designed equipment. Solutions found through these sources also carry a greater element of normalization because the products are designed for everyone. Examples of three major national supply company catalogues are:

Brodhead-Garrett Company
4560 East 71st Street
Cleveland, OH 44105

W. W. Grainger, Inc.
5959 W. Howard Street
Chicago, IL 60648

McMaster-Carr Supply Company
P.O. Box 4355
Chicago, IL 60680-4355

Your local public library may hold copies of these and other similar catalogues. Office supply catalogues, electronic equipment catalogues, and even automotive parts and accessories catalogues may be of value when searching for solutions or ideas.

It is almost impossible for anyone to have a complete collection of current national resources on assistive technologies at any one time. However, as a matter of practice over time, it is good to make requests and receive materials in order to search for options, and to keep abreast of current developments.

Locally Available Resources

Perhaps the best place to look for an answer to a problem is in your own backyard. Consider the advantages of acquiring local assistive technology products and services. A phone call and a short trip across town can provide a potential solution to a problem for demonstration, review, and prompt evaluation. Being able to try on clothes in a local department store versus ordering them out of a catalogue is a good analogy. A local company that produces automatic door openers should be the first stop on the path to seeking a solution to that kind of an access problem. A locally produced door opener has the advantages of quick acquisition, installation and adjustment as well as locally available service and repair. These same advantages hold true for most locally produced devices.

Every state has some form of classified directory of manufacturers and commerce listed by locality. Local libraries keep current copies of these directories in their reference section. Such directories list the names of company officials, as well as the number of employees, which can give an idea of the hierarchy and structure of the organization. The yellow pages are also a good reference to the local community. The agency should be checked to see if a statewide guide or system of acquiring local resources has been established.

Neighborhood and Community Establishments

In addition to manufacturing sources, there exists some common neighborhood and community establishments that may be overlooked. These include local hardware, electrical, plumbing, electronic, industrial supply, government surplus, restaurant, office, and janitorial supply stores and outlets. When browsing through these emporia, look for direct solutions to problems but also keep a mental inventory of the types of product lines they carry, i.e., sheet metal, plastics, tubing, adhesives, for future reference. Also remember coming close to a solution is valuable as it assures the prediction of being on the right track.

Local Service Shops

Local service shops, individuals, clubs and organizations also have potential as valuable resources. Local welding shops and job shops for machining and metal fabrication are excellent resources for both design and construction as well as repair. Television repair shops, depending upon their flexibility, may be able to fabricate switches and simple electronic controls. Television repair technicians have a good basis in understanding electronic circuits and their functions. This is because a television set (receiver) is comprised of almost every known electronic circuit. Although a television service shop may not perform warranty work, it may be able to make alterations and repairs to some rather sophisticated electronic aides and devices. A precaution is that some shops may operate under a less than professional manner. Good shops have good reputations and employ technicians holding degrees from vocational and/or technical schools who know their limitations. Other local service shops include electric motor repair for aides and devices with electric motor drives, and hydraulic/pneumatic repair for lifts and other such power assist units.

Local Professionals

Local practicing or retired (or unemployed) engineers, architects, technicians, mechanics, craftsmen, carpenters, and others comprise a set of individuals as local resources. They can be helpful as consultants and ultimately for hands-on assistance. They may be identified through networking with friends and associates or through memberships they hold with local chapters of their specific professional organizations. They may be members of private clubs or organizations such as the "Institute of Electrical and Electronic's Engineers" or "Telephone Pioneers of America." Many libraries contain a listing of national professional organizations representing various trades (e.g., The Encyclopedia of Associations by Gale Research Inc., Book Tower, Detroit, MI 48226). Contacting a national office should identify the local branch. The organizations and their members may be able to provide volunteer time and services or perhaps even equipment. Telephone Pioneers of America has, as one of its own stated national initiatives, a service of book reading and braille translation for visually impaired persons. Therefore, the premise is already established for that organization to provide assistance to persons with special needs. However they are identified, local technical persons, even the ordinary "handyman" can be valuable assets in the provision of assistive technology. It is important to note here that the option of first choice should be the incorporation of a rehabilitation engineer or engineering center practicing in the local area.

Hospitals and Clinics

One should also be aware of and establish relationships with local hospitals and clinics. Such facilities can be valuable sources of information on the effects of certain designs from a medical standpoint. Units to identify are those involved with Occupational Therapy, Physical Therapy, orthotics, and prosthetics. A typical example might be the application of a specialized tool for an employment site although there is concern about a possible problem with an unusual flexation required for its use. In this case the Occupational Therapy unit could provide consultation as to the subsequent effects of using that device. A certified prosthetist is extremely valuable because such a person is well established in both human sciences and the applications of physics and mechanics. Prosthetists are experts in the strengths, properties, and characteristics of plastics and certain lightweight metals and other materials and can predict where a piece of plastic will break first.

Colleges and Universities

If the practitioner is located near a college or university campus or vocational/technical school it should be included in the local resources group. Instructors or professors in technical divisions who may be interested in special practicums for students should be sought out. Since these persons are accustomed to studying designs for the general nondisabled population, projects involving rehabilitation technology may present unique and interesting challenges. A precaution is that the student approach is time limited and requires supervision to insure appropriate results.

Special Education Teachers

Local special education teachers can be both a resource and an access to information and technology used in educational settings. A special educator has possibly used techniques or technologies in the classroom that can be used for vocational purposes. Special educators have catalogues and other resources to specialized learning tools and courses which may be used or adapted to vocational or employment needs. Keeping in contact with these professionals also enhances the team concept in providing effective use of assistive technologies.

Consumers as Resources

Consumers, because of their direct experience with assistive devices, can be valuable in providing information about the actual effectiveness of approaches they have used. They may also provide ideas for improvement and alternative methods. A listing of consumers matched with various solutions would be most valuable as a resource guide for consultation.

Having a Resource Plan

A plan or strategy is needed for mapping resource search efforts both locally and nationally. Almost any logical plan will work if the basic nature of the device is understood. Figure 6.1 illustrates some of the characteristics of various information sources and their limitations and advantages.

The basic nature of any device falls into three categories (see Figure 6.2). These three can be thought of as electrical/electronic, mechanical power, and applied technique. This is not to categorize individuals but is a way to proceed in looking for solutions. Problems in the sensory areas such as sight, sound, or touch are most often solved by means of electrical or electronic devices such as a magnified video screen or telephone amplifier. Therefore, one would first look to electronic industries or catalogues of electronic items. In cases of limitations of strength, control or movement, a more mechanical means of assistance is suggested. The advantages of leverage, hydraulics, pneumatics, and other mechanical power assistance are usually applied here. The illustration places instructional and even behavior change techniques on a plane with "hard" technologies but sometimes a special training, learning technique, or procedural change is needed to form a solution. If so, then one can look to special educators' ideas or to industrial engineering to change either the training, work layout, or a restructuring of the job.

These three categories are only a place to start on a search and should not be thought of as exclusive or distinct, or the nature of all problems encountered. For instance, an automatic dialing (electronic) telephone may be the solution for a person with a physical (mechanically related) limitation. In any case, some initial direction must be chosen. As far as where to find answers, look locally first and then expand to a national search. Consider the advantages of local resources in terms of time and other factors. After all possible local resources have been reviewed the professional will have a better understanding of what specifically to look for on a national level.

The practitioner may wish to consider building a resource network for sharing information with other offices. The network could be based on information about persons and places found to be valuable both locally and statewide. The information might be listed on a routinely reviewed and updated computer file. This file would contain such items as names and addresses of cooperative extension agents and other individuals or organizations as useful resources.

Conclusion

This chapter has attempted to provide the reader with a broad base of suggestions for searching out solutions to the great number of diverse challenges in the field regarding assistive technologies. It is hoped that the "grass roots" emphasis on local resources will be valuable as a complement to the ever expanding national base of information on these technologies.

Figure 6.1

Comparing Information Resources

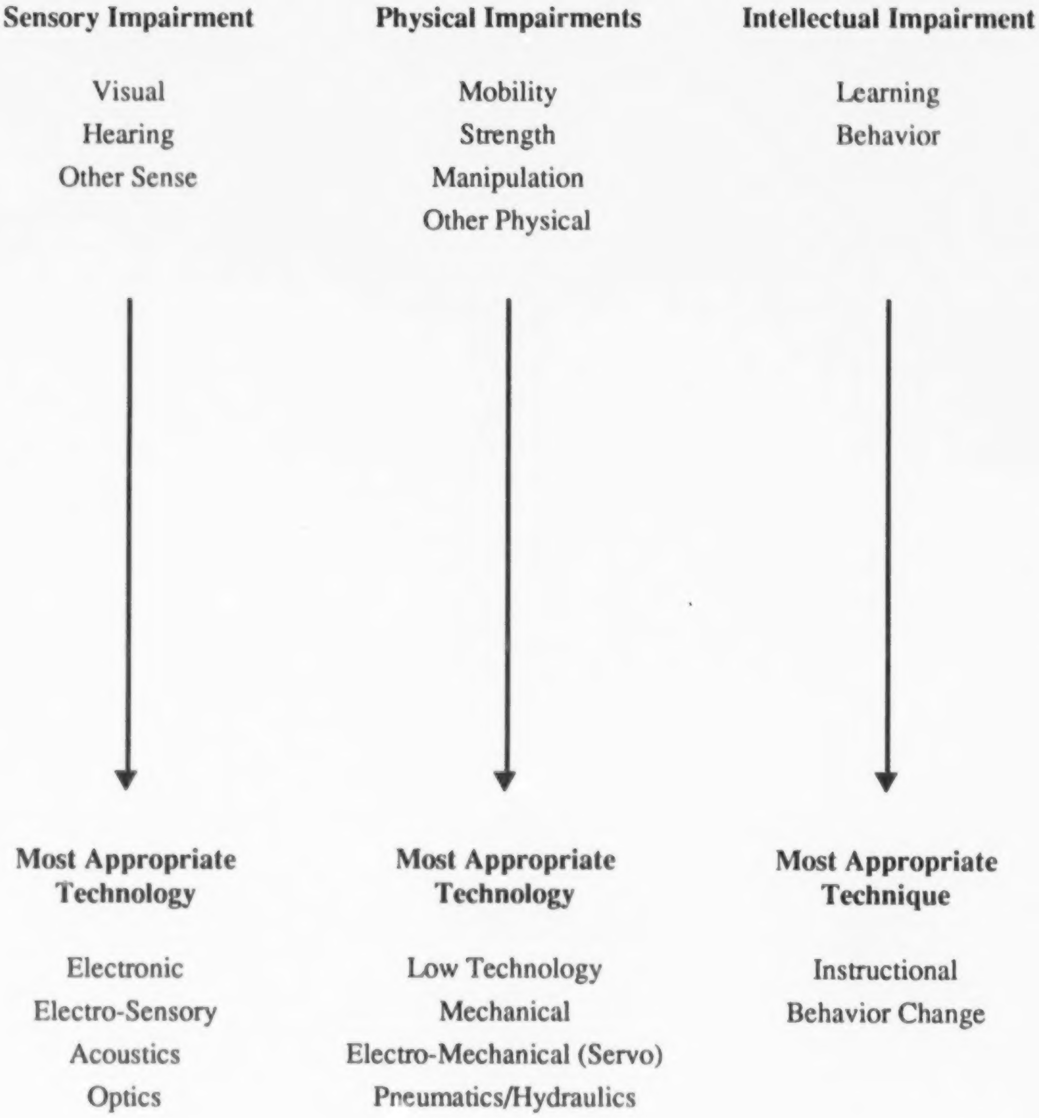
SOURCE	METHOD OF ACCESS	SPEED OF ACCESS	MODIFICATION ONE OF A KIND	COST OF INFORMATION	MAINTENANCE OF INFORMATION	ORIENTATION OF DATA	LIMITATION ADVANTAGE
Abledata	Computer (P.C.) phone	High speed	No		Updated monthly	Broad focus rec. to vocational	Updated regularly-no technical support **U, V**
JAN	Toll free phone	High speed for discussion; up to week for hard copy	Some capacity for information in this area	0	Updated by JAN	Vocational focus	Fast, up-to-date, no hands on **U, V**
Catalogues	Hard copy	But must be organized	No usually	May be subscription fee			**I, T, U**
Local information systems	Hands on & hard copy	Variable	Greatest strength	May charge for evaluation			**H** Variable
News letters	Hard copy	May not be indexed older information too hard to access	No - except by example	Subscription fees - usually under $50			**U**
R&T Centers	Hard copy & phone access	Dependent on staff available	Possible	0			**U, T, V**
Product centers	Phone access		Possible by referral	0			**I, U, T**

KEY: *Limitation Advantage column*

H	Hands-on try-out
I	Information on one product line
V	Information on variety of product lines
T	Technical support available
U	Updated regularly

Figure 6.2

Special Populations



CHAPTER SEVEN

Strategic Planning for Assistive Technology

I. Objectives:

1. to describe the importance of program planning for assistive technology
2. to outline planning options for agencies involved in assistive technology
3. to identify six planning activities critical to the delivery of assistive technology
4. to describe the ten key elements in operatonal models that will influence planning

II. Summary

The value of long-term or strategic planning for assistive technology as described in the context of this document cannot be overemphasized. Assistive technology will make new demands on rehabilitaton agencies which in turn, will require a system for the delivery of these services in both an efficient and effective manner. The need for planning will be evident in many ways such as training, funding, coordination of services, management, evaluation, etc. This chapter takes a look at these issues along with several others that must be considered in the planning process. In addition, options for the planning process and future trends are described.

III. Discussion

All rehabiliation agencies use planning to establish goals and objectives, as well as to monitor budgets, and to evaluate the results of their programs. The assistive technology area will require addressing some new issues, but planning will, more or less, follow the same process in operation at present.

The Importance of Planning

Assistive technology will make new demands and requirements on rehabilitaton agencies. In turn, these new demands indicate that a system for the delivery of these services be carefully planned to ensure a successful program. The need for planning is accentuated by:

- the role of the consumer as a key decision maker in the planning process at the individual user level
- the involvement of professionals with expertise in different areas, e.g., rehabilitation engineers, technicians, computer analysts, occupational therapists, etc.
- the need for a team approach to decision making and problem solving to obtain the value of varying perspectives in the process
- the need by rehabilitation organizations for alternative or cooperative funding
- the importance of managing information (resource information)
- the need to integrate assistive technology into the day to day operations of the organization
- the need by state rehabilitation organizations to obtain an accurate assessment of the client's potential to benefit from rehabilitation engineering services.

Options for Planning

Most rehabilitation agencies use some form of strategic planning to set annual goals, establish budgets, track expeditions and measure results. When assistive technology is included in the operation, the organization will need to consider if additional or a different planning method is needed. The literature in the area of management distinguishes among strategic, long-term, and operational planning (see Table 7.1 and 7.2 to differentiate among these approaches and the benefits of each approach).

When the method of planning is selected, the organizaton should consider the following three additional issues:

- the use of an outside consultant,
- the composition of the planning team and
- the level of involvement of top managers.

Below, Morrisey and Acomb (1987) recommend the use of an outside consultant since professionals in the field tend to conform to the status quo in order to minimize conflict. These factors alone are strong arguments for the use of an outside consultant or outside member on the planning team. Further, an outside consultant can:

- conduct a critical analysis of the organization,
- challenge the assumptions and directions of the organization, and
- sustain the planning effort over time (see Organizational Planning Process chart).

Organizations that engage in long-range planning for assistive technology will want to consider the assistance of individuals from similar organizations who have planning experience.

A planning team must be formulated, whether or not an outside consultant is used. The use of a planning team can assure a wide range of perspectives and create the capacity for linking with other organizations as the process proceeds. Whether planning is directed by an outside consultant or an agency person, the team should include members with diverse backgrounds to ensure diverse perspectives. Consumers, rehabilitation engineers, providers of assistive technology, employers, practitioners, policymakers, funding specialists, representatives of rural and urban areas and representatives of various cultures should be included on the planning team.

Commitment from top management to the planning process is consistently cited as a key element in planning. Top managers must understand the potential of assistive technology in order to effectively support the planning process.

Table 7.1

Planning Elements

		OPERATIONAL PLAN **ANNUAL**	LONG RANGE PLAN **1 - 3 YEARS**	ORGANZATIONAL STRATEGIC PLAN **3 - 5 YEARS**
	Planning Team		X	X
	Values Assessment	X	X	X
	Mission		May be described as goal	X
ANALYSIS	Strengths, weaknesses, opportunities, threats S.W.O.T.	X	X	
	Zero Assumptions	X		
	Market	X	X	
	Need	X	X	
VISION	Goals	X	X	X
	Objectives	X	X	X
	Strategies & Directions			X
EXECUTING	Activities	X	X	
	Financial Projections		X	X
	Budget	X	X	X
	Time Lines	X	X	X
	Evaluation	X	X	X

Figure 7.2

Planning Model Characteristics

	STRATEGIC	LONG-RANGE	OPERATIONAL
Primary Responsibility for Planning	Top Executive/Director - typically with outside consultant. Focus on broad strategies.	Internal assignment, often an executive as project director with input from field staff. Focus on functions and budget.	Staff assignment, often a project director with input from field staff.
Time to Plan	Major time commitment. Need time to organize 18 month process typical.	Moderate time commitment.	An annual or project based activity
Research	Research based - begins with quantitative analysis. Develops systems to collect and analyze data.	May involve market and needs analysis.	"Arm chair" analysis.
Level of Investment	Significant investment of time and money-also requires personal commitment to change.	Developing plan demands moderate time commitment, but substantial commitment to build acceptance.	Modest time commitment.
Special Benefits	Clearly defined direction-all activities and resources directed to agreed upon mission and strategies.	Recognizes time needed to develop concept and build change, build staff skills, involve other parties.	Familiar, easily measurable, clearly defined outcomes.
Special Costs	Lengthy and costly development, may challenge cherished assumptions.	Time commitment acceptance by staff and top management is necessary if plan is to be sustained.	May not allow time for development of ideas and skills internally or externally.

Ultimately, the critical issue in planning for assistive technology is determining what the organization intends to be in the future, how it will get there, how the effort will be funded, and how the wide range of collaborative relationships necessary to the delivery of assistive technology will be managed (Barry, 1986).

In answering these questions, organizations must respond to six steps which are:

1. organize for the planning process
2. assess values
3. formulate a mission
4. engage in analysis
5. develop a vision, and
6. execute the plan.

These six steps are applicable to any planning approach. The chart on the following page summarizes these steps in a flow chart.

The Six Planning Activities

The following is a detailed explanaton of the six planning activities listed.

I. Organizing to Plan

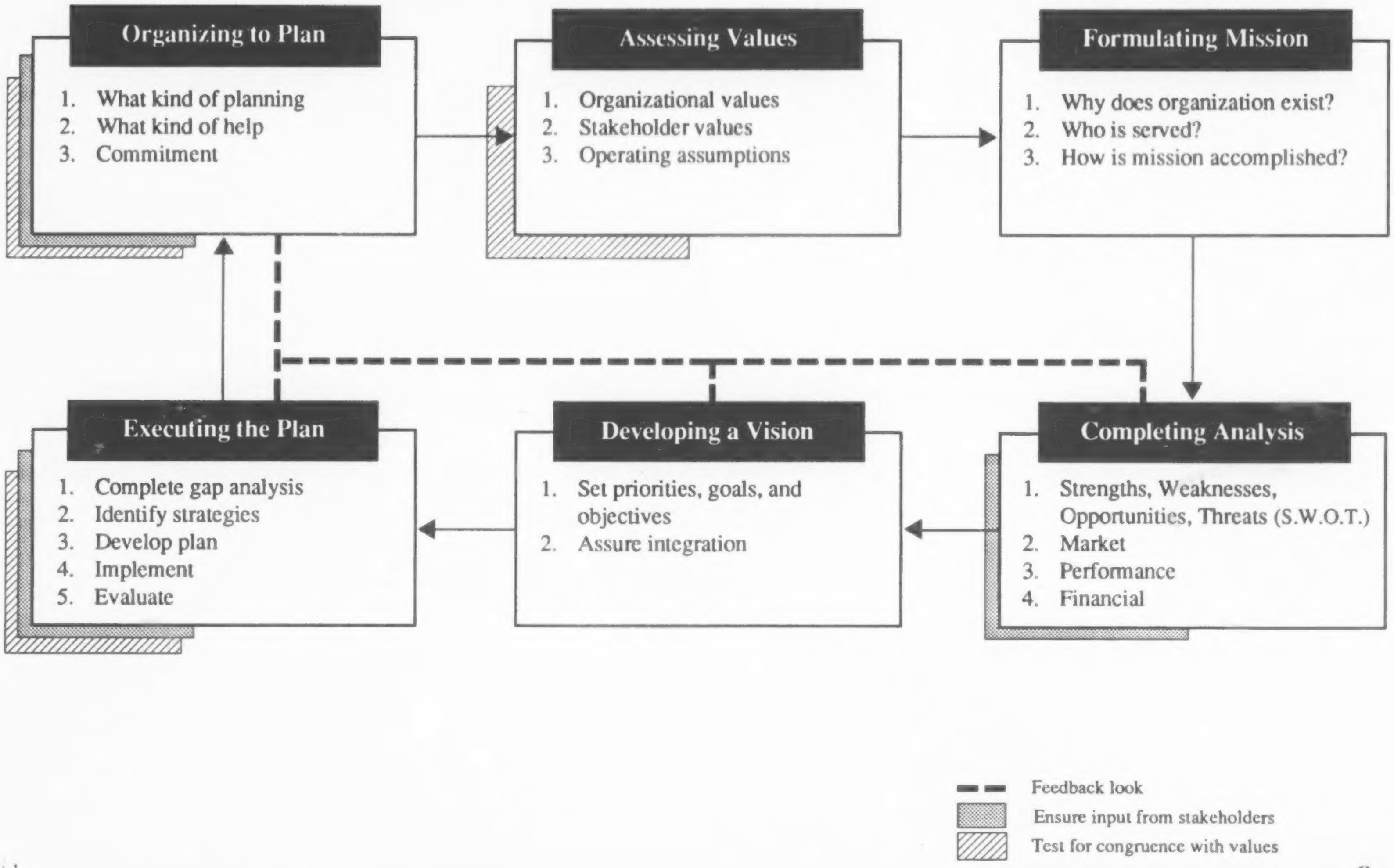
In strategic Planning Workbook for Non-Profit Organizatons, Barry (1986) lists five steps in organizing for planning:

1. decide that a plan is needed
2. obtain commitment to the planning process from staff
3. determine whether outside help is needed
4. decide which planning process fits the organization
5. form a planning team

Applied Strategic Planning. Pfieffer, Goodstein and Nolan (1985) describe environmental scanning as a starting point in the planning process. An environmental scan begins with a review of the following issues:

- the macro environment--what effect will outside developments in technology, labor market issues, and state and national political issues have on assistive technology?
- the competitive environment--how are other state rehabilitation agencies, other public and private agencies in the human service arena, dealing with assistive technology?
- the industry environment--what effect will state and federal funding have on assistive technology, what changes in rehabilitation legislation can be expected, and what effect will they have on planning?
- the internal environment--how will internal capacities and weaknesses affect planning, what impact will history, tradition and organizational culture have on the process?

Organizational Planning Process Chart



Organizing to Plan

1. What kind of planning
2. What kind of help
3. Commitment

Assessing Values

1. Organizational values
2. Stakeholder values
3. Operating assumptions

Formulating Mission

1. Why does organization exist?
2. Who is served?
3. How is mission accomplished?

Completing Analysis

1. Strengths, Weaknesses, Opportunities, Threats (S.W.O.T.)
2. Market
3. Performance
4. Financial

Developing a Vision

1. Set priorities, goals, and objectives
2. Assure integration

Executing the Plan

1. Complete gap analysis
2. Identify strategies
3. Develop plan
4. Implement
5. Evaluate

- - Feedback look

▒ Ensure input from stakeholders

▨ Test for congruence with values

Finally, in analyzing the forces that will influence a program, four groups of barriers are recommended for examination:

1. human barriers such as values and level of commitment
2. process barriers such as policies and funding mechanisms
3. structural barriers such as levels of authority and approval
4. institutional barriers such as the level of status or resistance to change

II. Assessing Values

Values are ideals and beliefs held to be important and may be considered the motivating factors of rehabilitation. Regardless, the planning process should begin with an assessment of organizational values, i.e., those reflected in the organization's culture and those held by individuals and stakeholders themselves.

Stakeholders are those individuals who have an investment in the outcome of the planning process, including consumers, counselors, employers, and other professionals involved in rehabilitation and/or assistive technology services. Finally, operating assumptions based on established priorities must be described (see Table 7.3).

Assessing values is a two step process where current values, assumptions, and ideals should be identified (Freeman & Gilber, 1988). Surveys, group discussions, and the use of techniques such as a nominal group process can be used to assess values. A typical question of values in assistive technology is, why should we fund a computer system for someone who will work only a three hour week when these same funds could be used to serve several individuals with less costly needs? Simply stated, values and clear guidelines for addressing divergent values among stakeholders who are not members of the organization will help address such questions.

Conclusions

The changing ethic and cultural work force must be recognized. Johnston (1987) predicts that the majority of the work force will be composed of minority populations by the year 2000. Planning must take into account the differing values and perceptions that will emerge. Identifying and understanding differences in values will be critical to planning with other organizations and professionals. A clear picture of consumer values will be essential in shaping services to meet consumer needs. Taking time to ensure that staff understand and operate on assumptions and values identified in this process will be essential to the consistent application of these values.

Table 7.3

Responsibility Grid

ORGANIZATION	CASE MANAGEMENT	KEY VALUE	KEY POLICY ISSUE	FUNDING AGREEMENT
Public Rehabilitation Agency	Manages case during vocational training and placement	Employment at level commensurate with capacities	Eligibility potential for employment	Will pay for devices and services needed for function on the job
Social Welfare Medicaid	Manages medical diagnostic process	Meeting mandated needs for medical services	Financial eligibility Medical necessity	Will cover medical examination, devices & services needed for ADL
Special Education Program	Manages vocational diagnostic process and academic training	Educational programming to develop life and work skills	Least restrictive setting, development of usable skills	Will cover vocational assessment, academic training & needed devices for programs
Hospital-based Program for Young Adults	Manages case during acute care or during fabrication of devices to enhance function	Restoration of function development	Effective acute care management to maximize function, development of devices to enhance physical function	No funding

CHAPTER EIGHT

Shaping the Future

I. Objectives:

1. to describe social trends that will influence the delivery of assistive technology in the future
2. to describe legislative trends that will provide the content of the future

II. Summary

Rehabilitation services are delivered in the context of far-reaching social trends. Legislation is moving the provision of assistive technology beyond the scope of public rehabilitation programs. Increased consumer awareness of the potential of assistive technology and the presence of other agencies involved in its delivery will create new opportunities for collaboration and additional demands for service.

III. Discussion

The Content of the Future

Much of the content of the future is being shaped by trends that operate in a broader context than the rehabilitation community. These trends include:

- growing public awareness and acceptance of people who have disabilities;
- increased integration of people with disabilities into the full spectrum of activities including work, school, housing, and recreation;
- increased consumer access to information about assistive technology and increased consumer access to assistive technology devices;
- increased consumer involvement in rehabilitation policy;
- rising costs of rehabilitation contrasted with declining purchasing power and, in some states, declining state revenue to support public rehabilitation programs;
- the increased severity of disability among those served by public rehabilitation agencies;
- the growing proficiency of medical technology in sustaining life and the demand from these survivors for assistive technology;
- increasing applications of assistive technology for infants and children and the support of this trend through legislation;
- the growing number of infants who are addicted at birth or have fetal alcohol syndrome and who may be in need of assistive technology;
- the aging of the total population with an increase in age-related limitations and a corresponding demand for assistive technology by individuals who have not previously viewed themselves as disabled;
- the rapid pace of technological change, affecting not only the range of assistive technology devices available to people with disabilities, but also altering the job market dramatically; and
- predictions of a smaller, more culturally diverse work force. The result may be more employment opportunities for people who have disabilities, but the changes will also increase the need for culturally appropriate methods of service delivery.

These trends have shaped and have been shaped by legislative initiatives. Examples of such legislation include the Americans with Disabilities Act (PL-101-336), the Rehabilitation Act of 1973 as amended (PL 93-112), the 1986 Amendments to the 1975 Education of all Handicapped Children's Act (PL 94-142 as amended), and the Technology Related Assistance for Individuals with Disabilities Act of 1988 (PL 100-407).

Assistive technology is being woven into the lives of people in rural and urban areas, older Americans as well as individuals with disabilities, through the legislative process. In addition, there are specific trends relevant for assistive technology which are discussed in this chapter:

- the development of professional standards
- the growing concern regarding product liability
- postsecondary education related to assistive technology.

These trends are emerging in response to consumer demand, increased product demand, and increased activities generated in states funded under the Tech Act.

The passage of legislation relevant to assistive technology has created both opportunities and demands for practitioners in rehabilitation. For example, the Americans with Disabilities Act is expected to create employer demands for information assistance in planning job accommodations, and provision of assistive technology. Meeting such employer needs will also create opportunities for future job development.

Americans with Disabilities Act (ADA)

The ADA represents both opportunities and challenges for rehabilitation practitioners. It will be necessary for rehabilitation agencies to determine how they will meet consumer and employer requests for assistance, advocate for employment opportunities and address employer concerns regarding compliance.

Title I of the ADA, the employment provisions, builds on concepts and definitions already used in Section 504 of the Rehabilitation Act of 1973 as amended. However, the provisions cover private sector employers with 25 or more employees until 1994 when it drops to 15 employees.

While the definitions and concepts used in the ADA are not new, heightened employer concern and interest are new factors. There has been extensive media focus on employer concerns about the employment provisions of the ADA. When analyzed, many of these concerns center around issues of cost and government regulation. At the same time, employer surveys reveal a genuine interest in receiving assistance in job and task analysis, job restructuring, and assistive technology. Rehabilitation practitioners can choose to be dismayed about apparent resistance to the Act, or they can choose to capitalize on the expressed need for information and assistance.

Title II of the ADA addresses physical access to public transportation for people with mobility impairments. Consumers and rehabilitation practitioners will need to play a role in assuring that attitudinal issues related to access are addressed, e.g., some individuals may need more time to sort money to pay fares, or to have destinations announced. Awareness training for drivers and a plan for maintenance of life equipment will also be critical issues.

Section 508 of the Rehabilitation Act

Section 508 of the Rehabilitation Act requires the development of guidelines to ensure access to electronic office equipment for individuals with disabilities. The breadth of influence of a narrowly focused legislative provision is illustrated in Section 508. The Department of Education through the National Institute on Disability and Rehabilitation Research and the General Services Administration have lead responsibilities for developing and coordinating guidelines.

The initial guidelines (1987) Access to Information Technology by Users with Disabilities ... Initial Guidelines identify three areas of access for individuals with handicaps:

1. access to and use of data bases and application programs,
2. support "in manipulating data and related information resources to attain equivalent end results," and
3. the receipt and transmission of messages when telecommunication devices use electronic equipment.

In the process of bidding for equipment, access to training, technical support, and upgrading of equipment are also considered.

Given the quantity of electronic office equipment purchased by federal agencies, these requirements will likely result in a generalized benefit far beyond federal agencies. Already, some computer companies have built in capacity to eliminate the need for multiple key stroke control. Several Japanese computer manufacturers have moved to establish industry-wide guidelines within Japan.

In addition to its influence on the development of accessible equipment, the legislation provides models for cooperation and change in at least three areas:

1. equipment accessibility specifications, including access to training on the equipment, trouble-shooting, and equipment up-grade,
2. development of an interagency forum which shares information among diverse agencies on the issue of accessibility, and
3. creation of centralized information on resources, training, and technical assistance for computer accessibility.

Finally, states receiving Tech Act Grants will be required to be in compliance with 508 if they apply for fourth and fifth year extensions.

Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act)

The Tech Act provides grants to individual states to develop consumer-responsive, comprehensive, statewide programs of technology related assistance. Emphasis is placed on developing consumer awareness of assistive technology and ensuring access to such technology. Provisions of the Act also require an analysis of policies, procedures, and systems for delivering assistive technology. This analysis is aimed at ensuring that assistive technology is available through early intervention, special education, habilitation, and vocational rehabilitation programs. Advocates are playing a key role in this process, particularly in identifying "out-dated traditions" and procedural blind spots.

Consumers involved with state rehabilitation organizations, Centers for Independent Living, special education programs, etc., can be brought into this information loop with relative ease. However, one goal of the grants is to assure that consumers outside these traditional organizations are reached, especially minorities. The concept of underserved minorities includes those individuals who, by virtue of age, disability, race, ethnicity, or location, have not traditionally had access to assistive technology devices and services. Examples of target groups include those under the age of three, the elderly, those previously found to be unfeasible for rehabilitation services, and rural African-Americans.

How information is disseminated and what information is disseminated are key issues. Traditionally, rehabilitation services have been delivered by bringing solutions to the consumer. Consumer access to information about assistive technology changes the dynamics of the relationship, empowering the consumer to make informed choices.

Heightened consumer awareness and demand will create the need for additional funding. Many recipients of Tech Act grants have developed a position for a funding specialist. Funding specialists have been successful in receiving coverage for assistive technology from Medicare, Medicaid, the Veterans' Administration, and the Social Security Administration; and have created an awareness of the benefits of assistive technology among these funding agencies. Rehabilitation practitioners can expect to look further afield for funding and to work collaboratively with a broader range of organizations.

Cost of Rehabilitation

The most frequently expressed concern about assistive technology is cost. Costs for devices that must meet Food and Drug Administration guidelines and for the development of one-of-a-kind devices will continue to reflect the increasing costs of innovation and labor. In contrast, there has been a trend toward decreased cost for items that have broader application such as voice input computer technology.

The Job Accommodation Network (JAN) has continued to compile data on the cost of job accommodation. Current data indicate that 50% of job accommodations cost less than $50 and that 69% of job accommodations cost less than $500. Similar data on the costs of assistive technology devices and techniques used in evaluation, training, or in the home are not available on a national level. Data gathered in Michigan for accommodations in all settings, for the period from January, 1989 through July, 1989, showed an average cost of $256.36 per client. Importantly, all of these data point to relatively modest costs for the majority of consumers. But, assuring that funding is available for those who need highly specialized costly assistive technology is essential. Using cost as a rationale for not providing assistive technology is not supported by available information about costs and funding (see Chapter 5).

Aging of the Total Population

It is predicted that one of every five Americans will be over the age of 65 by the year 2030. In addition, 50% of workers over the age of 45 will experience some degree of functional limitation (AARP, 1988). This graying of the work force will further strengthen the interest in assistive technology by individuals who may not perceive themselves as disabled. The demand for assistive technology devices by these individuals will have a normalizing effect on perceptions regarding such technology and will likely reduce costs for more widely used devices.

The interest of older workers in assistive technology will increase the need for additional technology-related training or re-training to meet changing job demands. It is estimated that 30 million workers will need to be re-trained to prepare for the increasingly technical nature of work (AARP, 1988).

Postsecondary Education

The number of rehabilitation engineering programs has grown in recent years along with multi-disciplinary programs. Universities are also developing programs to upgrade the skills of existing rehabilitation practitioners, including video classes for rehabilitation professionals in rehabilitation counseling, occupational therapy, and vocational evaluation in assistive technology. Programs have been developed that provide for cross training between the disciplines and increase opportunities for collaboration on projects. The availability of training gives agencies an increased range of options for cross training of staff. The availability will also exert pressure on agencies to upgrade the skills of existing staff.

Product Innovation

In considering the future of assistive technology, the concepts of "technological push" and "demand pull" must both be considered (Office of Technology Assessment, 1984). Technological push describes the effect of available technology on the development of new technology. Demand pull describes the effect of consumer demand on innovation. The effect of demand pull is muted by consumers' lack of information on available products and insufficient funds to buy needed assistive technology devices.

Cost and product liability influence both the push and pull effects. Product liability especially may interfere with the transfer of technology from a field unrelated to rehabilitation. Many assistive technology devices require review, testing, and approval by the Food and Drug Administration (FDA, 1987). These processes add time and cost to the development of products.

Growing interest in universal design may have a positive effect on demand pull by creating greater consumer awareness of and demand for products that are appropriate to a range of needs. In contrast, federal funding of Small Business Initiatives, which provide small business support services aimed at the development of technological products and services may have a positive effective on technological push -- especially in the area of highly customized or specialized products. In contrast to this optimistic note, product liability issues have had a well documented effect on slowing innovation as innovators have adjusted to the threat of liability by doing less.

Product Liability

Product liability issues are not intrinsically different for assistive technology devices. However, the fact that research, development, and manufacturing are often the provenance of small companies heightens the cost of liability insurance. The relative newness of the assistive technology process and the absence of professional standards further complicate the issue of liability. Mills (1989) offers a detailed analysis of these factors in a paper prepared for the Electronic Industries Foundation.

Gingerich (1981) discusses the evolution of product liability as well as the emergence of tort liability which grows out of a desire to assure safety and to spread the cost of this assurance across the whole of our society. The result of this noble objective has been dramatically increased costs for liability judgments and liability insurance, reflected in product cost and a quelling effect on innovation.

The range of liability issues and varied avenues for pursuing liability damages are daunting to the field of rehabilitation. As the range of assistive technology devices and the variety of service providers expands, it is reasonable to assume that performance standards for individuals and testing standards for products will be developed. Such measures can provide increased assurances of quality and safety for consumers. However, such standardization may increase costs and the caution with which innovations are developed.

Standards

As assistive technology has become more complex, several questions related to standards have emerged:

- Who is qualified to provide assistive technology devices?
- How is quality defined for assistive technology devices and services?
- How can the customer/consumer be assured quality devices?
- How can compatibility among assistive devices be assured?
- How can teamwork be fostered to ensure the collaboration required to create compatibility?

Professional Qualifications

Questions about who is qualified to prescribe, modify and/or fabricate assistive technology devices reflect concerns that consumers receive a product that is safe, reliable, and effective. These questions also reflect the desire of groups of professionals to establish the legitimacy of their role in providing a particular service. The issue of legitimacy has been especially complex in light of the rapid growth of assistive technology and the inclusion of new combinations of professionals.

The field of rehabilitation engineering provides an example. The Rehabilitation Engineering Specialty Group (1990), an interdisciplinary society for the advancement of rehabilitation and assistive technology, defines rehabilitation engineering as "the application of engineering and technology to the needs of people with disabilities." This definition encompasses a variety of specialists, including occupational and physical therapists, electronic technicians, machinists, and tinkerers. The Rehabilitation Engineering Specialty Group within RESNA is struggling to define rehabilitation engineering, both as a measure of quality assurance and as a move to assure third party payment for these services. Some of the issues that must be addressed include:

- the shortage of trained engineers working as rehabilitation engineers,
- the range of settings in which rehabilitation engineers work, from direct service provision to research,
- the varied training of individuals currently practicing rehabilitation engineering, and
- recognition that different levels of assistive technology (see Chapter 2) require different levels of skill.

Do standards for professional practice assure quality? Many consumers and rehabilitation practitioners say that professional qualifications alone will not assure that the consumer is provided with assistive technology appropriate to his/her needs. Some state that "people skills," i.e., a capacity for addressing problems in language that is understandable to the consumer and other rehabilitation practitioners, are critical to the success of a rehabilitation engineer. Yet, a different, more research-oriented set of skills may be necessary for rehabilitation engineers involved in research. As the complexity of many assistive technology devices increases, many consumers and rehabilitation practitioners are less qualified to assess quality or suitability. Professional standards may assure that the rehabilitation engineer is qualified to understand and interpret the technical issues. Exploration of the professional standards issue and of professional practice issues is likely to occur in all of the disciplines related to assistive technology.

The movement toward professional standards is seen by many as antagonistic to the self-help and consumers participation models of service delivery. Ideally, both trends can work to the benefit of the consumer. Chapter 2 identifies levels of assistive technology. Consumers must be able to access the information necessary to be informed decisionmakers. They should be able to identify situations where needs are so specialized or technical that a qualified professional will need to be available to identify, design or modify needed devices.

Professional standards may also benefit consumers when they result in approval for third party payment (e.g., insurance companies). However, a requirement that consumers rely on "qualified professionals" can create delays and increase costs. The growing interest in "use it out of the box" technology provides an important counterpoint to the growing concern with professional standards.

Product Standards

Product standards represent one attempt to define quality. The draft standards for wheelchairs being proposed to the American National Standards Institute are an example of product standards that have received support from consumers and rehabilitation practitioners. Such standards will provide a common language regarding wheelchair design, permit consumers to make comparisons among a range of options, and "permit prescribers to select the most appropriate wheelchair based on the features and dimensions of the chair."

Similarly, standards for adaptive driving devices such as lifts, tie-downs, seating, and primary driving systems are being developed by the Society of Automotive Engineers with support from the Association of Driver Educators for the Disabled. These standards will have the additional feature of crash test results.

In both instances, the success and acceptance of the standards have been enhanced by broad participation from consumers, vendors, rehabilitation practitioners, and specialists in the respective fields. Despite consumer input and acceptance of product standards, differences in values and perceptions between consumers and specialists are apparent. Wheelchair tie downs provide an example of these differences. Standards for tie downs and crash testing of tie downs are concerns of many rehabilitation practitioners and specialists in the field of adaptive driving. These concerns include safety, reliability, and liability. In contrast, many consumers view the tie downs as a time-consuming nuisance that add to costs, and interfere with freedom of movement. Balancing these differences in values and perceptions and gaining support for the standards from all parties is critical.

Compatibility

The interface between wheelchairs and adapted vans provides an illustration of the need for interchange and fit among assistive technology devices produced by different types of manufacturers. A wheelchair must fit the user's physical characteristics and the demands of his/her life style. For an individual who cannot transfer with ease, the wheelchair that meets the demands of the job and home life should be one that can be used as the driver's seat in the van. While wheelchairs and vans address mobility needs, only a limited number of wheelchairs are manufactured with a driving interface in mind (see Chapter 2).

Computer assisted devices illustrate problems of equipment interface and design standards that occur when several types of software and hardware are combined. For example, one problem of compatibility involves differences in operating systems between the Apple Computers used in most secondary school settings and the IBM systems used in many work settings. The difficulty of the transition from school to work is increased when the student who was trained on an Apple system must rework his/her needed accommodations for an IBM system in the work place.

The long term value of standards becomes apparent when one considers the needs of individuals who rely on computers for multiple functions. For example, an individual may use a computer as a tool for word processing, speech output, and environmental control. In addition, the person may need to be able to use the environmental control and speech output components in a portable system that can be operated from a wheelchair as well as at the work station. Issues of interface and compatibility may involve not only commercially available word processing software, but also keyboard enhancements, and individually designed speech output software. Assuring compatibility and reliability among these systems is critical. User-friendly guidelines for upgrading both hardware and software are also needed.

Universal Design

With the interactions among cost, product development, and the aging of the work force, the emergence of universal design is one of the most exciting trends. The concept of universal design grows out of the study of ergonomics and looks for design that is appropriate to the widest possible range of physical characteristics. The concept has developed outside of the practice of rehabilitation. As a result, much of the information has been published in popular literature. This broader focus may create greater demands of universally designed products. For example, The Consumers Union has been working with consumer and design specialists from across the country to develop guidelines and standards. The existence of universal design does not obviate the need for individualized and customized products. A parallel trend is the development of modular products designed with a range of changeable components where the work station can be modified to fit both the tasks to be performed and the characteristics of the user.

IV. Conclusion

Individuals work to maintain the familiar way that things are done, not out of malice toward new ideas, but because the familiar creates a sense of order and mastery. As they become embedded in assumptions, values, and processes, they are unable to see the limitations that are placed on those assumptions.

Assistive technology programs create a demand for new stakeholders in the rehabilitation process. The new perspectives, assumptions, and values of these stakeholders can shape an environment with a new set of operating rules or new paradigms about the delivery of rehabilitation services. Assistive technology can provide an opportunity to create the future or it can provide an opportunity to continue as usual, treating assistive technology devices and techniques as add-ons.

Thus, rehabilitation practitioners face a choice as the future is approached. They can incorporate assistive technology into the present paradigm, or they can choose to work collaboratively with consumers and other disciplines to harness technology and craft our vision of the future of rehabilitation.

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Appendix C

Categories of Assistive Technology

Aids for Daily Living: self help aids for use in activities such as eating, bathing, cooking, dressing, toileting, home maintenance, etc.

Augmentative Communication: electronic and non-electronic devices that provide a means for expressive and receptive communication for persons without speech.

Computer Applications: input and output devices (voice, braille), alternate access aids (headsticks, light pointers), modified or alternate keyboards, switches, special software, etc. that enable persons with disabilities to use a computer.

Environmental Control Systems: primarily electronic systems that enable someone without mobility to control various appliances, electronic aids, security systems, etc. in their room, home or other surroundings.

Home/Worksite Modifications: structural adaptations, fabrications in the home, worksite or other area (ramps, lifts, bathroom changes) that remove or reduce physical barriers for an individual with a disability.

Prosthetics and Orthotics: replacement, substitution or augmentation of missing or malfunctioning body parts with artificial limbs or other orthotic aids (splints, braces, etc.).

Seating and Positioning: accommodations to a wheelchair or other seating system to provide greater body stability, trunk/head support and an upright posture, and reduction of pressure on the skin surface (cushions, contour seats, lumbar).

Aids for Vision/Hearing Impaired: aids for specific populations including magnifiers, braille or speech output devices, large print screens, hearing aids, TDDs, visual alerting systems, etc.

Wheelchairs/Mobility Aids: manual and electric wheelchairs, mobile bases for custom chairs, walkers, three-wheel scooters and other utility vehicles for increasing personal mobility.

Vehicle Modifications: adaptive driving aids, hand controls, wheelchair and other lifts, modified vans, or other motor vehicles used for personal transportation.

Appendix D

Training (Case Studies)

BRIAN

Brian is a 24 year old high school graduate. He has severe cerebral palsy which affects all four extremities.

Capacities and Assets

He uses a manual wheelchair and can transfer independently.

His physician reports that he can perform simple grasping and manipulative tasks, although slowly.

Although his speech is very difficult to understand, he successfully uses a Cannon communicator.

He lives in a rural group home and is able to secure dependable transportation.

Limitations and Barriers

He has a low tolerance for devices.

He is not computer experienced and cannot write legibly.

He repeatedly breaks the back of his wheelchair because of uncontrollable extraneous movements.

BRIAN AND TOM

Tom is Brian's rehabilitation counselor. The following is an actual account of Tom's experiences with Brian.

Brian wished to work as a newsletter writer and editor for an advocacy group. He had previously worked with the group as a volunteer using a typewriter with a mouth stick and keyboard guard and therefore felt confident enough to work toward his goal. Tom agreed with Brian's objectives and was prepared to assist him. The advocacy group arranged for some work space in a local church with a typewriter and Brian was ready to start.

One of the first difficulties experienced by Brian was using the telephone. Tom suggested the use of an augmentative communication device for that purpose but Brian refused and insisted that what he really needed was a computer for greater speed and word processing, and that would also interface with a telephone.

STOP HERE FOR DISCUSSION. WHAT WOULD YOU DO NEXT?

Tom and Brian mutually agreed that Brian should first attempt to learn basic computer use. A rehabilitation technology center at a local university was contracted to provide the training on specialized computer equipment at their facility. Brian tried to learn the computer for approximately one week, but experienced great difficulty because of problems with basic writing skills such as grammar and punctuation. Tom tried to arrange for an adult basic education course at a local vocational school but Brian was denied admission based on his previous unsuccessful experiences with that school.

STOP HERE FOR DISCUSSION. WHAT WOULD YOU DO NEXT?

Tom found a computer at a local high school for Brian to use during the summer. He also found a teacher at the high school who was willing to tutor Brian on the computer while teaching him some basic writing skills. Through the rehabilitation agency, Tom purchased a firmware card and unicorn keyboard for Brian to use with the computer. The rehabilitation technology center sent a trainer to the high school to set up the card and unicorn. By mid-summer Brian was still having some problems but was getting his work done and operating the computer at the high school. As summer came to an end the students were about to return and the computer would no longer be available. The teacher also would not be available for tutoring. Brian returned to the church to continue his work where only the typewriter was available.

STOP HERE FOR DISCUSSION. WHAT WOULD YOU DO NEXT?

Tom begins to search for funding for a computer for Brian. United Cerebral Palsy is interested but is not yet able to provide assistance. Brian is kicked out of the church for general messiness and misusing others such as using the church secretary to do his work. Tom learns that Brian's family has the money to buy him a computer but is reluctant to do so because of the potential loss of SSI. Brian is now unoccupied and staying at the group home.

STOP HERE FOR DISCUSSION. WHAT WOULD YOU DO NEXT?

COMMENT

This is a true case. As such, it represents the realities and complexities involved within and around the provision of assistive technologies. The events and activities are presented as they actually occurred in 1989 and 1990. Only the names were changed to protect the identity of the individuals involved.

Tom is an experienced, highly regarded, counselor with his agency. You may agree or disagree with the actions he did or did not take. The following questions may help for further discussion: How could Tom have avoided some of the problems he encountered? Which of his actions were appropriate? Which of his actions were inappropriate?

****

SANDY SMITH

Your client, Ms. Smith, has cerebral palsy which affects all four extremities. Upper extremity coordination is slow. She uses an electric wheelchair.

Ms. Smith's speech is difficult to understand.

She types accurately on an electric typewriter, but the process is slow.

She excelled in math in high school. Her IQ is in the high average range, with above average results in spatial concepts.

She wants to work in the field of drafting.

You decide to:

1. encourage her to consider a work evaluation in a local rehabilitation facility

2. obtain detailed, current information about drafting

3. obtain a functional capacities evaluation

The work evaluation showed that Ms. Smith was unable to complete any of the work samples. Workshop staff recommended that she consider a community-based recreation and socialization program.

You decide to:

1. close her case as not feasible for employment, based on the results of the work evaluation.

2. try another approach to evaluation and refer her to the local Voc/Tech School (STIRC) for evaluation.

3. "give all that hi-tech stuff a try" and refer her to the Learning, Living Resource Center.

You obtain current information on drafting from the employment service and four local employers. You learn that it is possible to perform most drafting tasks by means of a computer.

You decide to:

1. refer the client to the Learning, Living Resource Center for an evaluation.

You obtain a detailed physical capacities report, completed by an occupational therapist. The physical capacities report outlines a significant number of limitations as well as capacities.

You next:

1. obtain a description of job demands and a job description for drafting.

2. determine that she cannot be feasible for employment; you close her case.

3. decide to try STIRC; you refer the client for an evaluation in drafting.

4. decide to refer the client to the Learning, Living Resource Center.

STIRC is willing to evaluate your client for entrance into the drafting program, but requests that you first refer her to the Learning, Living Resource Center to resolve equipment selection. STIRC staff describe the hardware and software that will be needed for training.

Ms. Smith appeals your closure decision. She points to the evidence of her intelligence, spatial abilities, and math skills. The district manager requests that you have her participate in an evaluation at the Learning, Living Resource Center to determine whether "high technology" will allow her to perform in the field of drafting.

The Learning Living Resource Center provides telephone consultation. You and the client have decided to use STIRC as an evaluation and training site.

Learning, Living Resource Center staff agree that they can provide an evaluation, but they will need a physical capacities report, a description of the computer hardware, and the CAD/CAM program that will be used in training.

1. You have the necessary information.

2. You need to obtain a physical capacities report.

3. You must obtain the necessary description of the computer hardware and the CAD/CAM program that will be used at STIRC.

Given the physical capacities evaluation and the information on hardware and software, your client comes to the Learning, Living Resource Center for an evaluation. The process involves you, the client, a consumer from STIRC, and the Learning, Living Resource Center staff.

The Learning, Living Resource Center staff recommend two options for alternative keyboards that will be compatible with the CAD/CAM system at STIRC, a computer assisted speech system that can be programmed with 20 key phrases frequently used in the classroom, and modifications to positioning in Ms. Smith's wheelchair. The speech assistance would be used as a backup to oral speech where speech and clarity were important.

STIRC staff place your student in a drafting evaluation. You lease an expanded keyboard and purchase some commercial software that reduces the number of key strokes required for certain operations.

Your client, the STIRC drafting instructor, and the counselor at STIRC select the key phrases to be used in the speech system.

STIRC contracts with a local occupational therapist to plan adjustments in Ms. Smith's work station, insuring proper positioning and minimizing energy expenditure.

You discover that your client hates STIRC and wants to go home. You:

1. close the case for failure to cooperate.

2. encourage the client to analyze the issues that are making her unhappy and develop a plan to resolve them.

Ms. Smith appeals the closure, saying she was not able to deal with the fatigue caused by being in class all day, but thinks she could manage with help. You:

1. agree to help her address the fatigue problem.

You encourage the client to stay at STIRC, noting that two days is not a fair trial. After analyzing what she finds difficult, you learn that her parents are encouraging her to come home and that dressing independently is taking several hours.

The STIRC counselor works with the parents to build their support of the client's program and provides support to Ms. Smith as well.

Three hours of occupational therapy service is purchased to help the client determine more efficient techniques for dressing and self-care. You:

1. agree to provide a half-hour of attendant care service in the morning and at bed time.

You, STIRC staff, a physical therapist under contract at STIRC, and the client analyze the fatigue problem.

Ms. Smith will begin an evening exercise program of stretching and relaxation.

She is encouraged to slowly build endurance for physical activity and classroom participation. Prior to attending STIRC she had not been socially, physically, or intellectually active. She will:

1. chart her gains in endurance.

Your client has stayed at STIRC! She is completing the first semester. You know that she still faces challenges: transportation, finding an employer, improving her communication system. However, she has demonstrated her ability to perform a range of drafting tasks on the computer.

****

Case #357

Program Classification

Computer set-up and training

Referral Reason

The Center for Rehabilitation Technology was contacted by a counselor from the Division of Vocational Rehabilitation to follow-up on recommendations made previously concerning a client receiving computer hardware and software.

General Description

On three separate occasions the client had participated in a computer evaluation and training program at CRT. Recommendations had been made to obtain an adaptive firmware card and Unicorn keyboard to be used on a computer somewhere within the individual's community. A local high school had agreed to allow the client to use its computer. An adaptive firmware card, Unicorn keyboard, and software had been purchased by the DVR counselor.

Objectives

The purpose of the referral was to have a staff member from CRT install and set-up the computer hardware and software at the high school. A tutor had been hired to assist the client in increasing his business correspondence abilities, as well as to provide the client with computer assistance if needed. The staff member from CRT was to demonstrate and explain the computer systems and software to the tutor.

Outcome

A total of five hours was spent in completing this project which included: travel to and from the community high school, setting up the adaptive firmware card, programming the Unicorn keyboard with customized overlays, and demonstration and explanation of both the computer hardware and software programs to the tutor. The cost of this activity was billed at $40.00 per hour for five hours. Follow-up letters were sent to the DVR counselor as well as to the client. No further recommendations were made.

Appendix E

The S.M.A.R.T. Exchange

Assistive Technology Needs Assessment

The S.M.A.R.T. Exchange
P.O. Box 724704 • Atlanta, GA 30339 • (404) 238-4568-4694
(404) 238-2275 TDD • 1-800-SMARTIE

State ______________________________

Adopter Site ______________________________

Address ______________________________

____

____

Phone ______________________________

Form Reviewed by:

____
Site Staff

____
S.M.A.R.T. Exchange Staff

The S.M.A.R.T. Exchange is a Regional Information Exchange Project of the National Institute on Disability and Rehabilitation Research and serves Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.

The Needs Assessment Process

The S.M.A.R.T. Exchange, a Regional Information Exchange Project funded by the National Institute on Disability and Rehabilitation Research (NIDRR), identifies successful components and practices in the area of assistive technology. The goal of The S.M.A.R.T. Exchange is to maximize awareness and adoption of these successful practices through information dissemination, technical assistance and adopter site linkages.

In order to successfully carry out the adopter site/technical assistance process it is necessary to: 1) clearly identify the needs of the adopter (agency, organization, individual, or family), and 2) assure that both the provider and the recipient understand the goals and projected results of the technical assistance process as well as the process itself. The following items are designed to assist you and your agency in identifying, prioritizing and implementing successful assistive technology services. The items outlined are not exhaustive of the possible needs you or your agency may have; however, they will establish the areas where technical assistance should be targeted. Use of this Needs Assessment should allow both The S.M.A.R.T. Exchange staff and the Adopter Site Participants to understand their roles and relationships and should result in a working document which reflects the steps of a successful process.

How to Use the Needs Assessment - This guide is organized around the S.M.A.R.T. Exchange *Quality Indicators Applicable to Assistive Technology Service Delivery Programs*. Each adopter site should review the Assistive Technology Needs Assessment and ask themselves:

1. What is the status of our project/site in this area?
2. Do we have other sources for support in areas that are not yet fully developed?
3. If we have no other sources of support in needs areas, what specific types of assistance do we need from The S.M.A.R.T. Exchange?
4. What are our priorities in meeting these needs? Is an identified need considered urgent, important, or is it acceptable to delay work in this area while other areas are addressed?

After identifying your areas of need, The S.M.A.R.T. Exchange staff will help you develop your SMART PLAN. This plan will outline which options or activities will best meet your identified needs. S.M.A.R.T. Exchange activities and resources could include, but are not limited to:

- Linkage with S.M.A.R.T. Successful Sites for development and implementation of specific assistive technology practices
- Printed information and resource materials
- Telephone consultation
- Referrals to consultants and others
- Regional and local workshops and conferences
- Training Institutes conducted by SMART Sites
- Teleconferences
- Consultation at workshops or other gatherings
- Consultation at Adopter Site
- Conference calls with consultants, successful sites, and/or other adopter sites

- Review and critique of materials developed
- Visits to successful sites
- Other, based on individual needs and creativity

Based on the use of this Needs Assessment as a planning instrument, an Adopter Site Agreement will be developed, outlining specific strategies and activities that will be conducted to achieve the identified goals. The Agreement and SMART Plan can also be used to review the status of this cooperative relationship and, if conditions change, they can be re-negotiated and revised.

Who Should Use the Needs Assessment - If you have participated in an IEP process, development of an IWRP, or other similar plans, you are familiar with the concepts of *team approach* and *consumer involvement*. The Needs Assessment can be useful for staff members, Board members, consumers, family members, and administrators. Involvement of these key participants will insure adequate needs assessment, increased understanding of project goals and activities, and appropriate targeting of resources. The act of completing the Needs Assessment and developing the SMART Plan can be a successful first step in the adopter site process.

Acknowledgements: In the true spirit of networking and resource sharing, The S.M.A.R.T. Exchange gratefully acknowledges the models provided by TLC-UCPA, Inc., and the Technical Assistance for Parent Programs (TAPP) in the development of this needs assessment.

The S.M.A.R.T. Exchange

ASSISTIVE TECHNOLOGY NEEDS ASSESSMENT

CRITERIA Numbers at the end of each item refer to specific criteria as detailed in The S.M.A.R.T. Exchange QUALITY INDICATORS APPLICABLE TO ASSISTIVE TECHNOLOGY SERVICE DELIVERY PROGRAMS	**Not yet planned/ developed**	**Partially planned/ developed**	**Fully planned/ developed**	**Other support available**	**Notes**
A. PHILOSOPHICAL FRAMEWORK 1. Printed materials include assistive technology services as a component of the organization (QI 1.1).					
2. A system to evaluate assistive technology services is developed and implemented (QI 1.7).					
3. Interventions used meet the following criteria (QI 1.5). Allow greater participation in natural routines. Allow use in multiple settings (home, school, work place, community). Promote opportunities to participate in activities alongside people without disabilities.					
4. Organizational policies are flexible enough to change practices in response to the needs of its consumers and staff (QI 1.6).					
5. The facility is physically accessible to all persons with disabilities (QI 1.8).					
6. Printed materials are produced in a variety of mediums, so that they are accessible to all persons with disabilities (i.e. Braille, large print, audio recordings, etc.) (QI 1.8).					

The S.M.A.R.T. Exchange

ASSISTIVE TECHNOLOGY NEEDS ASSESSMENT

CRITERIA Numbers at the end of each item refer to specific criteria as detailed in The S.M.A.R.T. Exchange QUALITY INDICATORS APPLICABLE TO ASSISTIVE TECHNOLOGY SERVICE DELIVERY PROGRAMS	**Not yet planned/ developed**	**Partially planned/ developed**	**Fully planned/ developed**	**Other support available**	**Notes**
7. Adequate financial resources are budgeted (or assistive technology services and devices (QI 3.3).					
8. The organization seeks out hard-to-reach, under-represented and under-served individuals and groups (QI 3.16).					
9. Established procedures and guidelines for managing and implementing technology services are documented and available for review (QI 3.2).					
10. The organization has a plan for keeping up with new technology services and devices (QI 3.4).					
B. CONSUMER/FAMILY PARTICIPATION 1. Consumers, their families and/or advocates are represented on decision-making committees, including board of directors, board of advisors, etc. (QI 2.2).					
2. Consumers are involved in all aspects of the organization, including decision-making, program design implementation and evaluation of services provided (QI 2.1).					

The S.M.A.R.T. Exchange

ASSISTIVE TECHNOLOGY NEEDS ASSESSMENT

CRITERIA Numbers at the end of each item refer to specific criteria as detailed in The S.M.A.R.T. Exchange QUALITY INDICATORS APPLICABLE TO ASSISTIVE TECHNOLOGY SERVICE DELIVERY PROGRAMS	**Not yet planned/ developed**	**Partially planned/ developed**	**Fully planned/ developed**	**Other support available**	**Notes**
3. The organization hires persons with disabilities as paid staff (QI 2.5).					
4. The organization utilizes persons with disabilities as volunteers within the organization (QI 2.5).					
5. Services are offered which teach consumers and their families to (QI 2.6): __ a. Identify their own assistive technology needs. __ b. Evaluate benefits and pitfalls of existing assistive technology devices recommended. __ c. Determine best technology options to meet their needs. __ d. Search out viable funding options.					
C. COMPREHENSIVE TECHNOLOGY SERVICE DELIVERY 1. The organization offers assistive technology services in one or more of the following areas (QI 3.1): __ Positioning and Seating __ Mobility __ Augmentative Communication __ Computer Access __ Adaptive Environments __ Adaptive Toys and Games					

The S.M.A.R.T. Exchange

ASSISTIVE TECHNOLOGY NEEDS ASSESSMENT

CRITERIA Numbers at the end of each item refer to specific criteria as detailed in The S.M.A.R.T. Exchange QUALITY INDICATORS APPLICABLE TO ASSISTIVE TECHNOLOGY SERVICE DELIVERY PROGRAMS	**Not yet planned/ developed**	**Partially planned/ developed**	**Fully planned/ developed**	**Other support available**	**Notes**
2. Materials and equipment are organized and accessible for use in other settings (QI 3.9).					
3. Staff are efficiently assigned to facilitate optimal assessment, planning and intervention using technology (QI 3.5).					
4. There is an effective plan for maintaining, replacing and repairing equipment (QI 3.17).					
5. An adequate inventory of assistive devices is available (QI 3.3).					
6. Staff training has been developed and implemented to ensure that pertinent staff are skilled in (QI 3.4; 3.14): __ a. Equipment use and maintenance __ b. Making adaptations __ c. Assessment techniques __ d. Team planning __ e. Integration of technology into curriculum or established goals __ f. Working with families re: technology-referenced decisions __ g. Implementing ongoing interventions using technology __ h. Evaluating the effectiveness of technology interventions __ i. Making needed refinements in technology interventions					

The S.M.A.R.T. Exchange

ASSISTIVE TECHNOLOGY NEEDS ASSESSMENT

CRITERIA Numbers at the end of each item refer to specific criteria as detailed in The S.M.A.R.T. Exchange QUALITY INDICATORS APPLICABLE TO ASSISTIVE TECHNOLOGY SERVICE DELIVERY PROGRAMS	**Not yet planned/ developed**	**Partially planned/ developed**	**Fully planned/ developed**	**Other support available**	**Notes**
7. Training for consumers on the use of assistive devices is offered by an appropriate team or person as the user needs it (QI 3.11)					
8. An information and referral system is in place to help those who might require assistive technology services not offered by the organization (QI 3.18).					
9. A system is developed to monitor consumer use of technology devices (QI 3.12).					
10. The written service plan (IFSP, IWRP, etc.) includes technology services, goals and methods as an integral tool to achieving consumer outcome (QI 3.20).					
11. Staff consider ready-made devices before designing and building assistive devices for an individual (QI 3.7).					
12. The organization keeps accurate up-to-date written records for all consumers receiving services (QI 3.8).					
13. Staff conduct inventories of needed skills in current, next and future settings important to the consumer and have taken this information into account in the planning process re: technology recommendations (QI 3.5; 3.15).					

ASSISTIVE TECHNOLOGY NEEDS ASSESSMENT

CRITERIA Numbers at the end of each item refer to specific criteria as detailed in The S.M.A.R.T. Exchange QUALITY INDICATORS APPLICABLE TO ASSISTIVE TECHNOLOGY SERVICE DELIVERY PROGRAMS	**Not yet planned/ developed**	**Partially planned/ developed**	**Fully planned/ developed**	**Other support available**	**Notes**
D. PROCEDURES FOR ASSISTING CONSUMERS IN OBTAINING FUNDING 1. Staff are knowledgeable about established funding options and have written guidelines for their use (QI 4.1).					
2. Specific staff members are responsible for coordinating funding procedures and exploring cooperative funding alternatives (QI 4.2).					
3. Staff assist consumers and their families appeal funding decisions (QI 4.3).					
4. If third party payment is not available, staff assist consumers locate funds from other sources (QI 4.4).					
5. Innovative practices are used to make assistive technology devices available (i.e., loan program, equipment, recycling, etc.) (QI 4.5).					
6. Information about the benefits of assistive technology services and devices are made available to funding sources and elected officials (QI 4.6).					
7. The organization seeks out new funding options and shares this information with others (QI 4.7).					

The S.M.A.R.T. Exchange

ASSISTIVE TECHNOLOGY NEEDS ASSESSMENT

CRITERIA Numbers at the end of each item refer to specific criteria as detailed in The S.M.A.R.T. Exchange QUALITY INDICATORS APPLICABLE TO ASSISTIVE TECHNOLOGY SERVICE DELIVERY PROGRAMS	**Not yet planned/ developed**	**Partially planned/ developed**	**Fully planned/ developed**	**Other support available**	**Notes**
E. CONSUMER SATISFACTION 1. Staff periodically assess either (a) the effects of the intervention plan targeting technology use; and/or (b) the effects of the consumer's use of the technology intervention (QI 3.12).					
2. Consumers are routinely surveyed to determine their satisfaction with participation, adequacy of services, and usefulness of devices (QI 5.1).					
3. Consumers, families, and advocates help design the consumer surveys (QI 5.2).					
4. Consumers, families, and advocates take an active part in the evaluation of services provided at each phase of the program (QI 5.3).					
5. Ongoing opportunities exist for consumer, staff, family, and advocate problem-solving in the determination of effective technology solutions (QI 5.4; 5.5).					
6. Information from surveys is gathered and used to change policies and practices when needed (QI 5.7).					

Appendix F

Policy Development Questions

In developing assistive technology programs, rehabilitation practitioners should consider and address the following policy questions:

Evaluation

Do policies assure that referrals are not screened out prior to intake, without consideration of the individual's ability to benefit from assistive technology?

Do policies assure that there is an evaluation of the individual's capacity to benefit from assistive technology before a decision is made regarding feasibility?

Do policies and values assure that counselors will consider assistive technology when evaluating referrals?

Is there a coordinated effort with special educators, hospitals and other referral sources to assess the potential benefits of assistive technology?

Consumer Roles

Does policy ensure that consumers are central in identifying the need for assistive technology?

Does policy require that consumers be able to choose assistive technology options that best meet their needs?

Are there clear guidelines for resolving differences of opinion between consumers and practitioners regarding the need for or selection of assistive technology?

Prescriptions/Specialists

Do policies create unnecessary obstacles to the provision of assistive technology?

Do policies define who may prescribe which levels of assistive technology? Do such policies serve to assure quality or to restrict access to assistive technology services?

If counselors can recommend commercially available assistive technology devices, have they been trained to identify issues related to appropriateness? (see Chapters 2 and 4)

Can consumers select commercially available assistive technology needed to achieve IWRP goals without needing a prescription?

If a prescription by a specialist is required (for example, occupational therapists or rehabilitation engineers), have these individuals been trained in the vocational and independent living applications of assistive technology?

Are there standards for the content of evaluations on which the prescriptions for assistive technology are based?

Individualized Written Rehabilitation Program (IWRP)

Does policy regarding documentation of the IWRP require that the use of assistive technology be considered in developing the plan?

Does policy require that issues such as funding, maintenance, upgrading of assistive technology be documented in the IWRP?

Funding

Does policy define those devices and techniques for which the counselor does not need approval to authorize funds?

If spending approval beyond the counselor level is required, does the approval process proceed in a timely manner?

Do policies on approval levels need to be revised in light of the rising costs of assistive technology and practitioner skills? Are there guidelines for exceptions and emergencies? Under what circumstances are multiple bids required for an item? Does the bidding process ensure cost management or merely create unnecessary delays?

Do practitioners have the information necessary to make full use of comparable benefits and services (similar benefits)?

Do practitioners have the information needed to make full use of the PASS (Plan to Achieve Self-Support) and IRWE (Impairment Related Work Experience) provisions for SSI and SSDI recipients?

Home Modifications

Does policy define who can complete a task analysis in the home? If architectural changes are needed to a home, does policy define the type(s) of specialists who may develop floor plans and specifications?

Does policy define constraints on home modifications (e.g., only to aid in employment or for independent living)?

Independent Living

Are differences in the evaluation, purchase, installation and/or follow-up of assistive technology defined for Independent Living programs?

Transportation

Are there guidelines governing the types of vehicle modifications that can be provided?

Are modifications linked to functional limitations (e.g., vans purchased only if the individual is unable to transfer independently from a wheelchair)?

Does policy define the frequency of vehicle modifications or describe a ceiling on cost (e.g., only one vehicle may be modified)?

Is there a requirement that adaptive devices meet certain standards (e.g., Veterans Administration approval)?

Can vehicle modifications be prescribed by vendors, or must they be prescribed by an independent source?

Placement

Does policy define those assistive technology devices the employer is expected to provide or purchase?

Does policy define those items which the consumer is expected to provide or purchase if he/she is employed? Is there a process for exception?

Does policy require that there be a task analysis prior to the provision of assistive technology devices?

Follow-Up

Is there a requirement for follow-up after the provision of assistive technology devices or techniques, to ensure effectiveness and consumer satisfaction.

Are there provisions for adjustments to assistive technology devices -- including those that may be needed during post-employment?

Are consumer responsibilities for maintenance and upgrading defined?

Is feedback on use of assistive technology by consumers, employers, evaluators, educators, etc. required? Is there a plan for integrating this feedback with future practice?

Appendix G

RESNA TECHNICAL ASSISTANCE PROJECT

State Self-Assessment Tool

State: ____________________

Date: ____________________

RESNA TECHNICAL ASSISTANCE PROJECT

State Self-Assessment Tool

Completed by: ____________________

Major Project Area	Project Elements	Assessment*	Rank**	Technical Assistance Needed from RESNA	Type of Technical Assistance Needed***
1.0 Needs Assessment	1.1 Methodology for any additional or ongoing assessment of consumer needs and/or service providers' needs	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	1.2 Consumer satisfaction feedback loop-ensuring that consumers are satisfied	1_2_3_	L_M_H_	Yes____No____	Type; ____________
2.0 Evaluation of Progress Toward State Systems Change	2.1 State Project Evaluation Instrument design-ensuring that project goals are being met	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	2.2 Assistance with national evaluation package:				
	1. Consumer responsiveness instrument	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	2. Service delivery instrument	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	3. System change instrument	1_2_3_	L_M_H_	Yes____No____	Type: ____________
3.0 Project Planning and Management	3.1 Assist in developing and reviewing RFP's for subcontracts	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	3.2 Establishing a budget process	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	3.3 Establishing interagency committees	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	3.4 Establishing volunteer committees	1_2_3_	L_M_H_	Yes____No____	Type: ____________
4.0 Involvement of Individuals with Disabilities	4.1 Issues in developing consumer-responsive systems	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	4.2 Accessibility Issues: databases, training materials, meeting sites, outreach, media selection	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	4.3 Accommodations: issues for disabled staff	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	4.4 Consumer-responsiveness evaluation	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	4.5 Consumer's role in advisory and management committees	1_2_3_	L_M_H_	Yes____No____	Type: ____________
5.0 Comprehensiveness of Assistive Technology Services Throughout the State	5.1 Cross-disability issues	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	5.2 Lifespan issues	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	5.3 State-wide coverage	1_2_3_	L_M_H_	Yes____No____	Type: ____________
	5.4 Geographic: rural, urban, etc.	1_2_3_	L_M_H_	Yes____No____	Type: ____________

Assessment Code*

1. Has been addressed adequately in state's proposal and staff feels confident to carry it out, does not require much attention at this time.
2. Is mentioned in state proposal but not adequately addressed. Requires some attention.
3. Little, if any, mention in state proposal. Requires major investment of resources.

Ranking Code**

Importance for attention within the next 1-2 years

- L Low importance
- M Moderate importance
- H High importance

Type Code***

1 Onsite Technical Assistance Visit
2 Information Materials
3 Training
4 Phone Technical Assistance
5 Other

State: ____________________

Date: ____________________

RESNA TECHNICAL ASSISTANCE PROJECT

State Self-Assessment Tool

Completed by: ____________________

Major Project Area	Project Elements	Assessment*	Rank**	Technical Assistance Needed from RESNA	Type of Technical Assistance Needed***
6.0 Interagency Coordination	6.1 Interagency agreements to establish or provide services	1__2__3__	L__M__H__	Yes____No____	Type: __________
	6.2 Management/advisory committee activities to develop and ensure interagency coordination	1__2__3__	L__M__H__	Yes____No____	Type: __________
7.0 Policy Analysis	7.1 Analyzing federal/state programs which impact the delivery and payment of assistive technology	1__2__3__	L__M__H__	Yes____No____	Type: __________
	7.2 Funding issues for the payment of assistive technology services and devices	1__2__3__	L__M__H__	Yes____No____	Type: __________
8.0 Public Awareness	8.1 Planning public relations	1__2__3__	L__M__H__	Yes____No____	Type: __________
	8.2 Use of alternative media e.g., cable TV, state fairs	1__2__3__	L__M__H__	Yes____No____	Type: __________
	8.3 Meeting and conference planning	1__2__3__	L__M__H__	Yes____No____	Type: __________
9.0 Outreach to:	9.1 Rural populations	1__2__3__	L__M__H__	Yes____No____	Type: __________
	9.2 Specific disability groups which are often underserved or traditionally not served by your state agency	1__2__3__	L__M__H__	Yes____No____	Type: __________
	9.3 Ethnic populations	1__2__3__	L__M__H__	Yes____No____	Type: __________
	9.4 Non-English speaking individuals	1__2__3__	L__M__H__	Yes____No____	Type: __________
10.0 Information Referral System/Services	10.1 Database development	1__2__3__	L__M__H__	Yes____No____	Type: __________
	10.2 Accessibility of resource information for sensory impaired individuals	1__2__3__	L__M__H__	Yes____No____	Type: __________
	10.3 Linkage to other resources, other States' activities	1__2__3__	L__M__H__	Yes____No____	Type: __________
	10.4 On-line services	1__2__3__	L__M__H__	Yes____No____	Type: __________
	10.5 Telecommunications options	1__2__3__	L__M__H__	Yes____No____	Type: __________
	10.6 Options for designing state systems (centralized vs. community-based) of information and system design	1__2__3__	L__M__H__	Yes____No____	Type: __________

Assessment Code*

1. Has been addressed adequately in state's proposal and staff feels confident to carry it out, does not require much attention at this time.
2. Is mentioned in state proposal but not adequately addressed. Requires some attention.
3. Little, if any, mention in state proposal. Requires major investment of resources.

Ranking Code**

Importance for attention within the next 1-2 years

L	Low importance
M	Moderate importance
H	High importance

Type Code***

1	Onsite Technical Assistance Visit
2	Information Materials
3	Training
4	Phone Technical Assistance
5	Other

State: ____________________

Date: ____________________

RESNA TECHNICAL ASSISTANCE PROJECT

State Self-Assessment Tool

Completed by: ____________________
____
____

Major Project Area	Project Elements	Assessment*	Rank**	Technical Assistance Needed from RESNA	Type of Technical Assistance Needed***
11.0 Training in Assistive Technology for:	11.1 Consumers/parents	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.2 Educators	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.3 Related service/allied health personnel	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.4 VR Personnel	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.5 Independent Living Center staff	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.6 Medical assistance (Medicaid) personnel	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.7 Private insurors	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.8 Legislators	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.9 Employers	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	11.10 Providers of services to individuals who are... 1. Visually impaired 2. Hearing impaired 3. Developmentally disabled 4. Older Americans 5. Infants/toddlers/pre-schoolers 6. Minorities 7. College students	1__2__3__	L__M__H__	Yes____No____	Type: ____________
12.0 Funding Issues:	12.1 Policy Analysis	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	12.2 Public/Private Sector Partnerships	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	12.3 Revolving Loan Funds	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	12.4 Equipment Recycling/Loan Programs	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	12.5 Medicaid, Medicare, VR, Special Ed., DD, and Aging Services, Procedures	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	12.6 Private Insurance	1__2__3__	L__M__H__	Yes____No____	Type: ____________
13.0 Provision of comprehensive assistive technology services-do you need assistance in developing these areas of assistive technology?	13.1 Positioning and Seating	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	13.2 Augmentative Communication	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	13.3 Computer Access	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	13.4 Adaptive Toys/Games	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	13.5 Adaptive Environments	1__2__3__	L__M__H__	Yes____No____	Type: ____________
	13.6 Mobility	1__2__3__	L__M__H__	Yes____No____	Type: ____________

Assessment Code*

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Ranking Code**

Importance for attention within the next 1-2 years
L Low importance
M Moderate importance
H High importance

Type Code***

1 Onsite Technical Assistance Visit
2 Information Materials
3 Training
4 Phone Technical Assistance
5 Other

Appendix H

Seventeenth Institute on Rehabilitation Issues Survey
Provision of Assistive Technology Services

1. Let's begin by making sure we have correct information about your program - name, address, and primary contact person(s).

   ____

   ____

   ____

   ____

2. Please describe the primary purpose and philosophy of your program. You may wish to use a descriptive mission statement.

   ____

   ____

   ____

   ____

3. How would you classify and describe your program model?

   Classifications

   a. Centralized ____
   b. Decentralized ____
   c. Center-based ____
   d. Regional/Satellite ____
   e. Mobile ____
   f. Durable Medical Equipment Supplier ____
   g. Community Independent Living Center ____
   h. Community Rural ____
   i. Community Parent-Operated ____
   j. Other ____

   ____

   ____

____

____

4. Please describe population(s) you serve.

a. Disabilities
Visual impairment ____
Hearing impairment ____
Physical impairment ____
Mental retardation ____
Learning disability ____
Other cognitive disabilities ____
Communication disorder ____
Other ____

b. Age Ranges _____ to _____

c. Geographic Area ________________________________

Northeast Alabama ______________________________

d. Settings
Home ____
Recreation ____
School ____
Community ____
Work/supported work ____
Center ____

5. Service Delivery Components

Components	*Purchase/ Provide*	*Not Purchased/ Not Provided*	*Planned*	*Not Planned*
a. Outreach and public awareness	____	____	____	____
b. Resource information on various devices, services	____	____	____	____
c. Coordinate technology teams	____	____	____	____
d. Assess individual's needs	____	____	____	____
e. Write justifications	____	____	____	____
f. Identify and secure funding sources	____	____	____	____
g. Customize devices	____	____	____	____
h. Fabricate devices	____	____	____	____
i. Install/set up/train in use of devices	____	____	____	____

j.	Follow-Up/Along	____	____	____	____
k.	Repair/Maintenance	____	____	____	____
l.	Equipment library loan	____	____	____	____
m.	Revolving loan/fund/financial assistance	____	____	____	____
n.	Research and development	____	____	____	____

6. Special Types of Technology Assistance

What types of technology-related assistance are provided by your program?

		Yes	*No*	*Not Sure*
a.	Aids for daily living	____	____	____
b.	Augmentative communication	____	____	____
c.	Adaptive computer systems	____	____	____
d.	Environmental control systems	____	____	____
e.	Home modifications	____	____	____
f.	Work site modifications	____	____	____
g.	Prosthetics and orthotics	____	____	____
h.	Seating and positioning	____	____	____
i.	Wheelchairs/Mobility aids	____	____	____
j.	Aids for vision impairments	____	____	____
k.	Aids for hearing impairments	____	____	____
l.	Vehicle modifications	____	____	____
m.	Adapted toys/games recreation	____	____	____
n.	Other	____	____	____

7. Staffing Patterns

Knowledge of staffing patterns is extremely important in crafting assistive technology services. A variety of people may be involved as key team players. Indicate which of the following team players may be involved (i.e., staff, contractor, vendor, volunteer) in providing technology-related services.

Team Players	*Staff*	*Purchased Services*	*Volunteer*	*Other*
Person with a disability	____	____	____	____
Parent	____	____	____	____
Director	____	____	____	____
Assistant director	____	____	____	____
Information specialist	____	____	____	____
Outreach specialist	____	____	____	____
Funding specialist	____	____	____	____
Rehabilitation engineer	____	____	____	____

Industrial designer	____	____	____	____
Carpenter	____	____	____	____
Physician	____	____	____	____
Blacksmith/Welder	____	____	____	____
Architect/Draftsman	____	____	____	____
Rehabilitation technologist	____	____	____	____
Independent living specialist	____	____	____	____
Occupational therapist	____	____	____	____
Physical therapist	____	____	____	____
Prosthetist	____	____	____	____
Orthotist	____	____	____	____
Speech pathologist	____	____	____	____
Augmentative communicative	____	____	____	____
Audiologist	____	____	____	____
Ophthalmologist	____	____	____	____
Optometrist	____	____	____	____
Chiropractor	____	____	____	____
Durable equipment supplier	____	____	____	____
Social worker	____	____	____	____
Rehab counselor/case manager	____	____	____	____
Recreation therapist	____	____	____	____
Adaptive computer systems specialist	____	____	____	____
Computer technician	____	____	____	____
Electrician	____	____	____	____
Machinist	____	____	____	____
Psychologist/Psychiatrist	____	____	____	____
Behavior specialist	____	____	____	____
Supported employment specialist	____	____	____	____
Reading/LD specialist	____	____	____	____
Peer counselor	____	____	____	____
Teacher	____	____	____	____

8. Sources of Funds

The prime study group recognizes the paramount importance of funding issues related to the provision of assistive technology services. This section is designed to clarify the way your program addresses this important service.

Please indicate which sources of funds your program uses to pay for assistive technology devices and services.

	Yes	*No*	*Not Sure*
a. Rehabilitation services (Title VI) (110 funds)	___	___	___

b.	Supported employment independent living services (Title VII)	___	___	___
c.	Social Security Act			
	1. Medicaid	___	___	___
	• Early periodic screening, diagnosis and treatment (EPSDT)	___	___	___
	• Maternal and child health (children's medical services)	___	___	___
	• Clinical services/MR/DD	___	___	___
	• Intermediate care for MR/DD	___	___	___
	2. Medicare	___	___	___
	3. SSI/SSDI			
	• PASS program	___	___	___
	• Disability related work expenses	___	___	___
d.	School programs	___	___	___
e.	Private health insurance	___	___	___
f.	Veteran's benefits	___	___	___
g.	Workers' compensation	___	___	___
h.	Services for the blind/visually impaired	___	___	___
i.	Services for the deaf/hearing impaired	___	___	___
j.	Civic and other not-for-profit programs	___	___	___
k.	Alternative finance program/low interest loans	___	___	___
l.	Equipment recovery/exchange program	___	___	___
m.	Agency budget (if other than above)	___	___	___
n.	Other (specify)	___	___	___

____

9. Ultimately, how successful is your program in obtaining funding for devices and services?

10. What makes your program unique?

11. Do you have a written procedure for feeding follow-up and consumer satisfaction recommendations back into the service delivery planning process? Use CRM (consumer resource management system) to feedback information into the system to document and recommend changes in service delivery.

12. Any comments you care to share about your program?

ADDITIONAL COPIES

The Provision of Assistive Technology Services in Rehabilitation

07-1615 .... $12.50

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